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AIR FORCE RESEARCH LABORATORY

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Test and Evaluation

AFRL FLIGHT TEST AND EVALUATION

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OPR: AFRL/VACD (Ms. Maggie Skujins) Certified by: AFRL/VA (Col John Wissler)
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This manual is for Air Force Research Laboratory (AFRL) Program Managers (PM) to use when planning and conducting flight tests and associated ground tests, such as taxi tests, as part of AFRL programs. This includes tests executed directly by AFRL personnel as well as tests executed by contractor personnel under contract by AFRL. The term "test" shall include laboratory tests, experiments and demonstrations. This manual gives helpful hints, basic instructions, and specific guidance for required actions needed to safely and successfully conduct flight testing. Since this manual is comprehensive, PM should tailor its application to their specific program's testing requirements. This manual should be widely disseminated and used throughout all AFRL technology directorates (TDs) two-letters, sites, and subordinate units. AFRL Plans & Programs (AFRL/XP) is responsible for the overall AFRL Test and Evaluation (T&E) policy. AFRL/XP has delegated implementation of AFRL T&E policy for flight test to AFRL Air Vehicles (AFRL/VA). This manual applies to all AFRL flight test programs. Ensure that all records created as a result of processes prescribed in this publication are maintained in accordance with (IAW) AFMAN 37-123 (will convert to AFMAN 33-363, *Management of Records*), and disposed of IAW the Air Force Records Disposition Schedule (RDS) located at https://afrims.amc.af.mil/. Refer recommended changes and questions about this publication to the office of primary responsibility (OPR) using the AF IMT 847, *Recommendation for Change of Publication*; route AF IMT 847 through the appropriate functional chain of command.

SUMMARY OF CHANGES

The previous document AFRLPAM 99-103, *AFRL Test Guide*, is now renamed AFRLMAN 99-103, *AFRL Flight Test and Evaluation*. This manual is substantially revised and must be completely reviewed. The revisions result from updated Air Force (AF) and Air Force Materiel

Command (AFMC) guidance and additional information and the incorporation of AFRL flight operations under the 412 Operations Group (412 OG). New and revised processes and topics include new flight operations requirements under the 412 OG new flight authorization process, government flight representative (GFR) requirements, revised requirements for conducting a technical review board (TRB), new safety review board (SRB) chairman appointment process, and new notes to the buyer.

Chapter 1—HOW TO USE THIS MANUAL

Chapter 2—TEST REQUEST DOCUMENTATION

Chapter 3—TEST PLANNING

Chapter 1

HOW TO USE THIS MANUAL

1.1. Introduction: This manual identifies and discusses the actions required of the AFRL PM to successfully execute their flight test program. AFRL does not generally perform traditional T&E for system suitability. However, these processes support the success of AFRL technology validation. In this manual, the term "test" shall include laboratory tests, experiments and demonstrations. This manual discusses the test processes required to conduct a successful flight test program. It contains individual write-ups for each test action with the definition of the action from the governing document and a discussion of how to conduct the action. At the end of each write-up is a list of the governing documents that apply to that topic. Also included in this manual are additional topics of interest to the PM. These may be required for specific programs.

1.1.1. Contact the AFRL Flight T&E office for additional information and assistance for flight test programs at least 3 months prior to first flight / taxi:

AFRL/VACD
Building 45, Room 134, WPAFB OH 45433
DSN 785-4404
E-mail address: afrldl-flighttestandevaluation@wpafb.af.mil
Global address: AFRL DL-Flight Test and Evaluation

1.2. Scope. The guidance in this manual applies to all AFRL flight test programs (including any associated ground tests) for which AFRL has vehicle ownership, mishap accountability, or liability. This guidance also applies to all flight tests executed by organizations or contractors under contract to AFRL. To eliminate duplication of effort, technical and safety reviews conducted by other organizations partnered with AFRL, possessing mature, well defined and documented review procedures, may be accepted at the discretion of the appropriate AFRL Test Approval Authority (TAA).

1.3. AFRL Definitions.

1.3.1. Test: AFRL does not generally perform traditional T&E for system suitability. However, these processes support the success of AFRL technology validation. In this manual, the term "test" shall include laboratory flight tests, experiments, and demonstrations.

1.3.2. Aerospace Vehicle: In this manual, the term "aerospace vehicle" includes, but is not limited to, manned aircraft, atmospheric rockets, balloons, unmanned aerial vehicles (UAV), and radio controlled models.

Chapter 2

TEST REQUEST DOCUMENTATION

2.1. Program Introduction (PI) Document or Statement of Capability (SOC).

DEFINITIONS:

The PI document is the initial formal planning document submitted by the program office to AFMC test organizations to formally request test support.

The SOC is a test organization's formal response to a request for test support listing capability and cost which, when signed, is a formal commitment of resources.

DISCUSSION: The AFRL PM, starting as soon as general program requirements and schedules are set, develops the PI. The PI must contain enough information to permit the test organization to evaluate its ability to provide the required support and provide estimates of reimbursable cost and schedule of performance. Although the initial PI must be made early enough to permit an alignment of funds between the customer program and the T&E activities, this will not preclude further refinement of the test requirements before a reimbursable order is issued and work begins. The PM may request inputs on the draft PI from the proposed test organization. PM may prepare the PI using the universal documentation system (UDS). However, the UDS is very large and cumbersome; therefore, the AFRL Flight T&E office has developed a tailored PI format which the test centers accept. This tailored format is given in **Attachment A5.4**. Use this suggested outline and tailor it to your particular program. Use AFRL Form 17, *Program Introduction Cover Sheet* as the cover sheet for the PI. Either coordinate the PI with the AFRL T&E office or send them a copy of the PI. **Note:** If using the Arnold Engineering Development Center (AEDC), contact those directly for their PI form, which is different from the AFRL tailored PI format.

The test organization responds to the PI request for test support with a SOC. The test requester and test organization set a SOC due date (time between AFRL submission of PI and test center formal response), normally 30 to 45 days depending on the complexity and requirements of the test. However, for small programs, the time may be shorter. The test organization uses the SOC to:

- Accept the test program and provide the specific levels of support.
- Accept prerequisites or constraints for support.
- Provide a preliminary cost estimate.

The laboratory requester should review the SOC thoroughly to determine if the PI requirements will be satisfied before accepting it. Additional discussion should be conducted to clarify any areas of concern.

There are times when a PI is not the appropriate agreement mechanism to use. In these cases, use a memorandum of understanding (MOU). Refer to the MOU write-up in **Para** 2.2.

Governing Documents: AFMCI 99-103, *Test Management* and AFMCI 65-602, *Uniform Reimbursement and Pricing Procedures.*

2.2. MOU, Memorandum of Agreement (MOA), and Letter of Agreement (LOA).

DEFINITION: An MOU and a MOA are used exclusively with organizations external to AFRL. A LOA may be used to document agreements between internal AFRL organizations.

DISCUSSION: In some instances a PI may not be appropriate for the services or resources required of a particular agency. In those cases (usually agreements between AFRL and a non-AFMC government organization), the involved agencies write a MOU, MOA, and LOA to outline the respective tasks and responsibilities. Refer to AFRLI 25-201, *Formulation and Oversight of Alliances*, for a discussion of MOU, MOA, and LOAs and suggested formats.

Additional items to consider for including in MOU, MOA, and LOA:

- Identify the LTO and PTO and the accompanying responsibilities. Refer to **Para** 3.3.13.
- All test plans require a safety and a technical review. Include in the MOU, MOA, and LOA the identification of who will conduct these reviews. Refer to **Para** 5.1 for a discussion of assignment of responsibilities.
- Identify who has mishap accountability. Refer to **Para** 3.3.9 on mishap accountability.
- If AFRL personnel will fly on the test or support aircraft, add that the flying unit will provide egress and any other required training. Refer to **Para** 6.3 for information on aircrew flight authorization.
- If government furnished property (GFP) is to be flown, a safety of flight certificate is required. Identify who will provide the certification. Refer to **Para** 4.6 on safety of flight certification.
- If use of a non-AFMC government aerospace resource is required, contact Headquarters AFMC Operations Support Division (HQ AFMC/A3O), or the AFRL Flight T&E office for guidance and assistance on obtaining the resource. The more advance notice given of the requirement, the better chance the resource can be available when required.
- Determine who has liability. More than one organization may have liability for parts of the program. Refer to **Para** 3.3.6 for a discussion of liability.
- If the use of the radio frequency (RF) spectrum is required, contact HQ AFMC Command Support Branch (HQ AFMC/A6, DSN 986-0782) for guidance and assistance in obtaining radio equipment certification and RF assignment authority. Refer to **Para** 3.3.15 for a spectrum management discussion.

Governing Document: AFRLI 25-201.

Chapter 3

TEST PLANNING

3.1. General: The first part of this chapter presents processes that the PM needs to consider when planning for a successful flight test program. They must be considered at the start of program planning and initiated early, if applicable. The second part of this chapter presents test-related topics. Some are used in the processes discussed in this manual. Others are general information of interest to the PM. Reference **Attachment A9.1** for the Test Program Checklist and **Attachment A9.2** for the Flight Test Program T&E Tasks Schedule Checklist.

3.2. Test Planning Processes.

3.2.1. Preliminary Test Planning Considerations.

DEFINITION: Efforts that should be considered before initiating any documentation requiring test and evaluation.

DISCUSSION: Each program has its own special requirements and peculiarities. It would be difficult to make a list to satisfy all programs, but some basic items are provided below. These items are not listed in sequential steps but presented as items to consider prior to testing. A Test Program Checklist is also given in **Attachment A9.1**. A task schedule for the flight test process can be found in **Attachment A9.2**. Forecast known or proposed flight test requirements in the annual AFRL T&E Forecast Survey conducted by the AFRL Flight T&E office; use AFRL Form 24, *AFRL Air Force and Non-Air Force Test Support Requirements.*

- Clearly define the test requirements.
- Will a purchase request (PR) package be required?
- What test related data items are required in the PR package?
- When should logistics assistance be requested? Is support from a GFR required?
- What is the test schedule?
- Is flight authorization required? Apply for authorization early.
- Who should be responsible test organization (RTO)? Lead test organization (LTO)? Participating test organization (PTO)? Initiate required documentation.
- Prepare a draft PI or MOU document.
- Discuss the draft PI or MOU with the AFRL Flight T&E office or the test agencies. If dealing directly with test agency, send a copy of the MOU or PI to the AFRL Flight T&E office for information.
- Will GFP be provided? If so, what documentation is required?
- Is a T-2 modification included in the program? Contact the AFRL Flight T&E office or the test center for additional assistance. If working directly with the test center, notify the AFRL Flight T&E office of the modification.
- What program design reviews are required?
- Establish who has mishap accountability.
- Is formation of an Integrated Test Team (ITT) appropriate?

- Address liability. Determine and document who has liability; it may be the government or the contractor or divided between organizations.
- Address spectrum management. Identify frequency requirements early and coordinate with the frequency manager at the test location.
- Address encryption.
- Who writes the test plan? Who approves the test plan?
- Determine where the safety review and the technical review will fall in the schedule and who will conduct them. Ensure contract states that contractor will provide the test plan for government review and approval and will support these reviews.
- Include 412 Test Wing (412 TW) coordination in test schedule.

3.2.2. T&E Items for PR Package.

DEFINITION: Those items included in PR packages that specify requirements for T&E support.

DISCUSSION: Depending upon the procurement required, certain T&E items should be addressed in the PR package. Examples are as follows:

- PR packages that contain test requirements, contracted or test center conducted aerospace vehicle modifications, lease, loan or GFP aerospace vehicles, flight tests or items to be tested shall be identified to the AFRL Flight T&E office. PR packages specifying lease, loan, or GFP aerospace vehicles may request HQ AFMC Director of Operations (HQ AFMC/A3) to review the maintenance attachment.
- PR packages that involve demonstrations, experiments or tests by a supporting organization must include documentation from the commander or director of that agency stating the support resource as planned will be made available. This documentation may be:

  - SOC from the supporting organization, or
  - MOU with the supporting organization, or
  - If a SOC or MOU is not possible due to time constraints, then a written statement from the commander or director is required.

- PR packages that include contractor conducted taxi or flight tests will include the following requirements in the statement of work (SOW) or statement of objectives (SOO) and in the contract data requirements list (CDRL). Suggested wording for notes to the buyer for these topics is given in **Attachment 6**.

  - The PR package shall contain verbiage that states that the contractor shall support design reviews.
  - The PR package shall contain verbiage that states that the contractor shall use the AFRL Flight /Taxi test plan format to be used in conjunction with data item description (DID) DI-NDTI-80566A/T, *Test Plan* and will support the government SRB and TRB.

- The PR package shall contain verbiage jointly agreed on by the PM and the directorate safety monitor that documents the steps the contractor shall take in the event of an unplanned occurrence.
- The PR package shall contain verbiage that states that the contractor shall provide lessons learned.

- PR packages that contain contracted modifications to government aerospace vehicles:

  - Prior to initiating the PR package, the contract initiator will coordinate all proposed contractual documents with the organization that will have test vehicle configuration control board (CCB) authority during the modification installation.
  - The contract must state that the contractor shall support the necessary Temporary 2 Modification to support research, development, test and evaluation (T-2) modification process reviews.

- PR packages that state that the government has assumed some of the risk of loss of a vehicle or requires contractors to fly on government vehicles or pilot government vehicles (including UAVs) will engage a GFR.
- PR packages that involve a GFP vehicle, loan vehicle, or result in the development of a technology demonstrator shall include:

  - Requirements in the design phase for telemetry encryption devices, unless a waiver has been granted in accordance with AFI 33-201V1, *Communications Security (COMSEC).*
  - Applicable tailored requirements for:

    - AFI 10-220(I), *Contractor's Flight and Ground Operations.*

- PR packages requiring delivery of equipment to be flight tested on a Department of Defense (DoD) aerospace vehicle shall require:

  - A review by the detachment system safety manager to determine if a system safety program tailored to the requirements of military standard (MIL-STD)-882D, *System Safety* is required.
  - A safety of flight certificate for equipment per MIL-STD-27733, *Modification and Marking Requirements for Test Equipment in Aerospace Vehicles and Related Support Equipment* and DI-MISC-81562, *Temporary Non-Standard Modification Documentation and Marking Requirements for Test Equipment in Aerospace Vehicles and Related Ground Support Equipment*.

  Reference **Para** 4.2 for a discussion of these documents. This was previously called the airworthiness certificate.

Governing Documents: AFMCI 21-126, *Temporary 2 (T-2) Modification of Aerospace Vehicles,* AFI 10-220(I), MIL-STD-27733, MIL-STD-882D, DI-MISC-81562, DI-NDTI-80566A/T, and AFMCI 21-119.

3.2.3. Operational Safety, Suitability, & Effectiveness (OSS&E).

DEFINITION: OSS&E is achieved by using a disciplined engineering process throughout a system's life cycle to ensure that activities such as operational use, configuration changes, maintenance repairs, and part substitution do not degrade system or end-item baselined characteristics over their operational life.

DISCUSSION: OSS&E is a disciplined engineering process that includes the following:

- Operational risk management (ORM).
- System safety.
- Configuration management (CM).
- T&E.
- Total ownership cost.
- Technical orders (TOs).
- Inspections and maintenance.
- Sources of maintenance and repair.
- Sources of supply.
- Training.
- Certifications.
- Operations and maintenance (O&M).
- Technology demonstrations.

The primary elements that apply to AFRL programs are ORM, system safety (risk elimination or reduction), CM (T-2 modifications), T&E, certifications (safety of flight, SEEK EAGLE), and technology demonstrations. Others may apply to individual programs. These elements are discussed elsewhere in this manual.

Governing Documents: AFPD 63-12, *Assurance of Operational Safety, Suitability, and Effectiveness*, AFI 63-1201, *Assurance of Operational Safety, Suitability, and Effectiveness*; AFMCI 63-1201, *Implementing Operational Safety, Suitability, And Effectiveness (OSS&E) And Life Cycle Systems Engineering.*.

3.2.4. ORM.

DEFINITION: ORM is a logic-based, common sense approach to making calculated decisions on human, material, and environmental factors before, during, and after AF mission activities and operations, i.e., on and off the job.

DISCUSSION: The principles of ORM encompass all aspects of test programs.
The steps to the basic ORM process are:

- Identify the hazards.

- Assess the risks.
- Analyze the risk control measures.
- Make control decisions.
- Implement risk controls.
- Supervise and review.

What does this mean to the AFRL tester? The AFRL PM is responsible for ORM in each test. The ORM steps are built into the AF test plan technical and safety review processes and the T-2 modification process. By following the processes identified in this manual, the tester ensures that the risks have been identified, minimized, and accepted.

Governing Documents: AFI 90-901, *Operational Risk Management*; AFMCPAM 63-101, *Risk Management*; AFRLI 91-101, *Laboratory System Safety Program,* and AFRLI 91-2021, *Laboratory Mishap Prevention Program.*

3.2.5. Program Preliminary and Critical Design Reviews.

DEFINITION: A preliminary design reviews (PDR) and critical design reviews (CDR) are formal technical reviews of the preliminary and detailed design of the contracted item(s).

DISCUSSION: A PDR is optional and a CDR is required for contracted items. The reviews compare the contractor's work with the contract requirements and assess the work. The PDR is a review of the basic approach and is similar to a technical interchange meeting (TIM); the CDR establishes the baseline of the developmental item.

3.3. Test Related Topics.

3.3.1. AF Operational Test and Evaluation (OT&E) Center.

DEFINITION: OT&E: Testing and evaluation conducted in as realistic an operational environment as possible to estimate the prospective system's operational effectiveness and operational suitability.

Air Force Operational Test and Evaluation Center (AFOTEC): The AF designated operational test agency.

DISCUSSION: The term OT&E means:

- The field test, under realistic combat conditions, of any item of (or key component of) weapons, equipment, or munitions for the purpose of determining the effectiveness and suitability of the weapons, equipment, or munitions for use in combat by typical military users; and

- The evaluation of the results of such tests.

AFRL PM rarely are involved with OT&E or AFOTEC. However, if AFOTEC assistance is required, the Wright-Patterson Air Force Base (WPAFB) AFOTEC point of contact

(POC) is located in the Aeronautical System Center F/A 22 Test and Evaluation division (ASC/YFT) DSN 674-5164.

Governing Document: AFI 99-103, *Capabilities Based Test and Evaluation.*

3.3.2. Encryption.

DEFINITION: Application of measures designed to protect transmissions from interception and exploitation by means other than crypto analysis.

DISCUSSION: Based on the test location and level of sensitivity of transmitted data, encryption may be required. Address this requirement early in the test planning. Reference AFI 33-201V1 **Table 1**, for further guidance. Questions may be addressed to the HQ AFMC Information Assurance office (HQ AFMC/A6OM).

Governing Document: AFI 33-201V1.

3.3.3. Foreign Comparative Testing (FCT).

DEFINITION: A T&E program centrally managed by Office of the Secretary of Defense (OSD) which provides funding for United States (US) T&E of selected equipment items or technologies developed by allied or friendly countries when such items are identified as having good potential to satisfy valid DoD requirements.

DISCUSSION: Secretary of the AF International Affairs (SAF/IA) annually requests project nominations for the FCT program. AFRL can nominate programs to compete for the funds.

Governing Documents: DoD 5000.3-M-4, *Joint Test and Evaluation Procedures Manual*; and AFMCI 99-103.

3.3.4. ITT.

DEFINITION: A cross-functional team of empowered representatives from multiple disciplines and organizations and co-chaired by testers and the PM. The ITT is responsible for developing the T&E strategy and the Test and Evaluation Master Plan (TEMP) and guiding the development of integrated test plans. An ITT is recommended but not required.

DISCUSSION: The ITT supersedes the test planning working group (TPWG) with expanded responsibilities as described in AFI 99-103.

AFRL programs with multiple organizations involved may benefit from formation of an ITT. The ITT should be formed sufficiently early to shape the requirements and test strategies of the program. ITT membership includes representatives from the program office, the RTO, the PTO, system contractors, and requirements community. Subgroups of the ITT may be formed to write test plans or handle specific tests or test issues. A “test

team" is the subgroup of testers and other experts who write test plans and carry out testing according to specific test plans. The PM and a representative from the test center are the co-chairs of the ITT. The ITT will write a formal, signed charter describing team membership, responsibilities, resources and the products for which the ITT is responsible. A sample ITT charter is available in **Attachment A5.2**.

The ITT initiates selection of the RTO. The ITT will nominate their choice for RTO, with the RTO's concurrence, to the director of the directorate owning the program for approval. The ITT chairman will notify the HQs AFMC Fielding and Test division (HQ AFMC/A3F) of each RTO selection decision. Reference **Para** 3.3.13 for RTO information.

Governing Documents: AFI 99-103, AFMCI 99-103.

3.3.5. Joint Test and Evaluation (JT&E).

DEFINITION: An OSD sponsored test and evaluation program conducted among more than one military Service to provide T&E information on combat operations issues and concepts.

DISCUSSION: The JT&E program charters joint test projects to evaluate military capabilities and potential options for increasing joint military effectiveness. The JT&E program focuses on evaluating current equipment, organizations, threats, and other areas. The JT&E projects are not acquisition programs but are totally distinct and separate from multi-service testing. See AFI 99-106, *Joint Test and Evaluation Program*, for further guidance.

Governing Documents: AFI 99-103, AFI 99-106.

3.3.6. Liability.

DEFINITION: For the purposes of this instruction, the term "liability" refers to the obligation incurred by a party to compensate for any loss or damage that occurs during the performance of the contract.

DISCUSSION: Liability in the event of a mishap can be allocated to the AF or the contractor, within certain limitations, by clauses added to the contract. However, to be effective, these liability clauses must be added early in the process, preferably before the request for proposal (RFP) is issued to the contractors. Allocating liability before the contract is signed reduces confusion, conflict, and delay when a mishap occurs during the performance of the contract.

The PM can assist in this matter by: identifying the different risks associated with different projects; and notifying the contracting officer (CO) or administrative contracting officer (ACO) of these risks before RFPs are issued. This will allow the CO or ACO to insert clauses or language assigning liabilities to either the contractor or the government for various events. Typical patterns of liability are:

- Government owned and operated:

  - When the vehicle, operator, and airspace are government resources, liability will typically remain with the government. Different services may reimburse each other for damages due to mishaps caused by another service's program.
  - If one service tests weapons or aircraft on another service's property repeatedly or if one service requests it, a MOU can be drafted to outline the respective services' liabilities. The engineer should contact the CO or ACO on that contract immediately if this situation presents itself.

- Contractor owned /or operated:

  - If the contractor has an ownership interest in the vehicle or the airspace or employs the operator, liability can be allocated to either the government or the contractor in the contract.
  - **Note*:*** The DoD Federal Acquisition Regulation Supplement (DFARS) Section 252.228.7001, *Ground and Flight Risk*, states at part (b) "Except as may be specifically provided in the schedule as an exception to this clause, the government assumes the risk of damage to, or loss or destruction of aircraft in the open, during operation, and in flight (for fixed price contracts). The contractor shall not be liable to the government for such damage, loss, or destruction (i.e. for AF or unaccepted aircraft)." Also reference DFARS 252.228-7002 (Aircraft Flight Risk Clause) on cost – reimbursement contracts.
  - Points worth noting: When this clause is included in the contract, the government assumes liability as a default option (to keep contract costs down, since the government pays for the insurance the contractor has to obtain to cover itself from liability); and the government can write an exception to this in the schedule that would allocate liability to the contractor, if it so chooses. Another important point is that the government only assumes liability when the contractor flight crew members have been approved in writing by the GFR and the contractor's ground and flight procedures have been approved by the GFR. Additionally, the contractor is bound to follow the provisions of AFI 10-220. HQ AFMC/A3 is the waiver authority for AFI 10-220. The contractor is responsible for submitting waiver requests to HQ AFMC/A3 through the GFR assigned to the contract.
  - If either the ground and flight risk clause (GFRC) or aircraft flight risk clause is on the contract, GFR oversight is required. Contact the administrative contracting officer (ACO) who can put you in contact with the GFR assigned to the contract.

3.3.7. Live Fire Test and Evaluation (LFT&E).

DEFINITION: The firing of actual conventional munitions (or surrogates if actual conventional munitions are not available) at components, subsystems, sub-assemblies, or full-up, system-level targets or systems to examine personnel casualties, system vulnerabilities, or system lethality, and the evaluation of the results of such testing.

DISCUSSION: LFT&E results must support system design and production decisions for covered systems. Contact the 46th Test Wing Operations Group Munitions Test Division, (46 OG/OGM), Eglin AFB, for assistance with development of LFT&E strategies.

Governing Documents: AFI 99-103, AFMCI 99-103.

3.3.8. Major Range and Test Facility Base (MRTFB).

DEFINITION: The MRTFB is a set of test installations, facilities, and ranges that are regarded as "national assets".
DISCUSSION: These assets are sized, operated and maintained primarily for DoD test and evaluation missions. However, the MRTFB facilities and ranges are also available to commercial and other users on a reimbursable basis. DoD Directive (DoDD) 3200.11 *Major Range and Test Facility Base (MRTFB)* contains a list of the MRTFB.

Governing Documents: DoDD 3200.11, AFI 99-103.

3.3.9. Mishap Accountability.

DEFINITIONS: Mishap: An unplanned event, or a series of events, that results in damage to DoD property, occupational illness to DoD military or civilian personnel, injury to DoD military personnel on-or off-duty, injury to on-duty civilian personnel; damage to public or private property or injury and illness to non-DoD personnel caused by DoD operations, including contracted operations.

Mishap Investigation Responsibility (Mishap Accountability): The organization with mishap accountability investigates the mishap and recommends corrective action to prevent future mishaps. Mishap accountability in no way implies blame or mishap responsibility.

Note: AFMCI 99-103 also defines test mishap accountability as: the organization that pays for test-related repairs and replacements must be written and approved in the test planning documentation. Testing often requires the preplanned damage or destruction of a unique test asset. Even where damage is not planned, testing involves unknowns that could increase the likelihood of damage and loss. Mishap accountability is part of the cost of conducting the test and in no way implies blame or mishap responsibility.

Safety Mishap Investigation: Investigation of an AF mishap for the sole purpose of mishap prevention.

DISCUSSION: Unless established through a prior MOU and MOA, the AF assigns statistical accountability for each mishap to the command or organization that experienced the loss of an owned asset. For statistical purposes, the event is recorded as a mishap in that command (or in the AF At Large, when applicable) regardless of any determination as to responsibility for the mishap occurrence. If two or more commands are involved, the flight mishap is normally assigned to the command credited with the aircraft's flying hours at the time of the event. Non-flight mishaps are assigned to the command owning the damaged AF equipment or injured personnel.

Mishap accountability will be clearly established in writing prior to conducting tests.
The Major Command (MAJCOM) commander of the organization accountable for the mishap is responsible for its investigation unless relieved of this responsibility by HQ United States Air Force (USAF) Safety (HQ USAF/SE).

There are five classes of mishaps:

- Class A Mishap: A mishap resulting in one or more of the following:
  - Direct mishap cost totaling $1,000,000 or more.
  - A fatality or permanent total disability.
  - Destruction of an AF aircraft. **Note**: A destroyed UAV is not a Class A mishap unless at least one of the first two Class A mishap criteria are met. Otherwise, if a UAV is damaged or destroyed, the mishap class is determined by the value of the vehicle damage.
- Class B Mishap: A mishap resulting in one or more of the following:
  - Direct mishap cost totaling $200,000 or more but less than $1,000,000.
  - A permanent partial disability.
  - Inpatient hospitalization of three or more personnel.
- Class C Mishap: A mishap resulting in one or more of the following:
  - Direct mishap cost totaling $20,000 but less than $200,000.
  - An injury resulting in a lost workday case involving eight hours or more away from work beyond the day of shift of which it occurred.
- Class D Mishaps are not applicable to aviation related mishaps.
- Class E Events: These occurrences do not meet reportable mishap classification criteria, but are deemed important to investigate/report for mishap prevention. Class E reports provide an expeditious way to disseminate valuable mishap prevention information.

When several organizations are involved with the test, the organization that has mishap accountability must be clearly established prior to conducting tests. This is done through MOUs or other test agreements and also will be documented in the SRB minutes. If AFRL has mishap accountability, the organization responsible for convening a safety investigation board is:

- Class A Mishap: AFMC Commander (AFMC/CC)
- Class B through E Mishap/Event: AFRL Commander (AFRL/CC)

The 412 OG is the grounding and return-to-fly approval authority for AFRL Class A or Class B mishaps (reference **Para** 6.6). For all other classes of mishaps, any grounding

decision is made by the AFRL SRB chairman after consulting with the AFRL TAA and the AFRL Flight Safety office (AFRL/SEF). The AFRL SRB chairman gathers comments from his board and recommends return-to-fly to the AFRL TAA. The AFRL TAA approves the return-to-fly order.

When AFRL programs use any aero club aircraft, contact the AFRL Flight T&E office. Some aero clubs transfer mishap accountability to AFRL for Research and Development (R&D) flights; others do not. AFRL is responsible for conducting the safety reviews for all AFRL aero club R&D flights, whether we have mishap accountability or not.
For more information and assistance on mishap accountability, contact your directorate safety office or AFRL/SEF.

Governing Document: AFPD 91-2 *Safety Programs*; AFI 91-204, *Safety Investigations and Reports*; AFI 99-103, AMFCI 99-103.

3.3.10. Multiservice OT&E.

DEFINITION: Multiservice OT&E is T&E conducted by two or more DoD components for systems to be acquired by more than one DoD component, or T&E of a DoD component's systems that must be interoperable with another DoD component.

DISCUSSION: Multiservice OT&E is conducted on acquisition or sustainment items by two or more services and jointly implemented. The designated lead service has the overall responsibility for management of the multiservice program and will ensure supporting service requirements are included. When the AF is designated the lead service, the ITT will document the other service's responsibilities, resources, and methods to eliminate conflicts and duplication. The PM will use MOUs to document responsibilities. When the AF is not the lead service, the PM will defer to the other service's test instructions, or as agreed in the MOU.

Governing Document: AFI 99-103.

3.3.11. Precedence Ratings.

DEFINITION: A macro-management tool that sets priorities for efficiently using available resources to meet mission needs.

DISCUSSION: To help prioritize T&E projects, all systems receive a precedence rating based on the nature of the system, its contribution to national security, and its overall AF mission according to AFI 16-301, *US Air Force Priority System for Resources Management.* The type of testing conducted has no impact on the assigned precedence rating assigned. Everyone involved in the program will use the assigned precedence rating when scheduling test resources. Contact HQ AFMC Plans Division (HQ AFMC/A8X) for precedence rating assistance.

Governing Documents: AFI 16-301; AFPD 16-3, *Priorities for Resources Management*; AFI 99-103.

3.3.12. Readiness Review Process.

DEFINITION: The readiness review process will ensure that all preparations for initiating a test have been completed and known anomalies have not compromised the execution of the test.

DISCUSSION: This review is required for acquisition programs and may be useful for laboratory programs. The readiness review will be conducted before the commencement of testing for new starts and major system upgrades, major test milestones, or after an extended break in test activity. All reasonable efforts to minimize risk must be made and verified to the TAA.

Governing Document: AFMCI 99-103.

3.3.13. RTO, LTO, and PTO.

DEFINITIONS: The RTO is the lead government developmental test organization on the ITT that is qualified to conduct and responsible for overseeing developmental T&E.

The LTO is the lead government entity that is qualified and responsible for the planning, safety, execution, and reporting on R&D testing for science and technology (S&T) programs.

DISCUSSION: Determination of RTO or LTO:

- RTO: For S&T programs that require the use of a MRTFB or Air Logistics Center (ALC) or the AFRL program falls under AFI 99-103, an RTO is required. The AFRL/CC, as the technology executive officer (TEO), has delegated the authority to approve RTOs for AFRL programs to the director (or designee - no lower than deputy or associate director) of the directorate owning the program. The ITT initiates selection of the RTO and submits their RTO selection to their directorate's director for approval. If the program does not have an ITT, the PM will contact the AFRL Flight T&E office for assistance to determine the appropriate RTO to nominate to their director. HQ AFMC/A3 maintains a matrix

  of testing types and qualified AFMC organizations on their website **https://www.afmc-mil.wpafb.af.mil/HQ-AFMC/DO/dop/rtopage.htm**. When selecting an AFMC candidate RTO, go to the matrix and find the organization appropriate for your testing. Other RTOs may be MRTFB members. Contractors shall not be designated as the RTO, but T&E tasks may be delegated to them. Send a copy of the RTO designation letter to HQ AFMC/A3 for their information. **Attachment A4.1.1** contains a sample RTO designation letter with coordination.

- LTO: For AFRL S&T programs that do not use a MRTFB or ALC, the LTO concept is used.
- The PM nominates an LTO to their directorate. If only one directorate in AFRL is the only government organization involved in the test, then that directorate by default is the LTO and no formal letter is required.
- AFRL/CC or the designated representative will formally approve the LTO. AFRL/CC has designated the AFRL technical director (who may further delegate to their deputy or associate director) as the representative to approve the LTO for programs in their individual directorates.
  - Use the MOU to define the AFRL and the test organization's and other participants' responsibilities.
  - Contact the test organization early in your test planning to properly integrate them into the AFRL program.
  - The LTO must be a government organization, but the LTO may not be a MRTFB or ALC.
  - Contractors may not be designated as the LTO, but T&E tasks may be delegated to them.
  - **Attachment A4.1.2** contains a sample LTO assignment letter.

Responsibilities:

- RTO responsibilities:
  - RTO responsibilities are outlined in AFI 99-103.
- LTO responsibilities:
  - Oversee management, planning, conducting, and reporting on S&T test programs.
  - Formulate an integrated test approach and develop a test concept.
  - Designate and define test responsibilities and oversee the activities of participating organizations.
  - Oversee program safety.
  - Participate in ITT and other integrated product team meetings as required.

Additional comments:

- LTO tasks may be delegated to a contractor in the SOW.
- A non-AFRL organization may only become the LTO for an AFRL test asset if AFRL transfers this function through an MOU or PI. The ultimate responsibility for the test program resides with the LTO.

DEFINITION: The PTO is any test organization required to support specific T&E data or resources for a T&E program or activity.

DISCUSSION: The PTO provides specific test support as determined by RTO/LTO. The PTO designs its assigned portion of the test program and conducts that portion according to the agreed upon plan. The PTO should also be contacted early in the test planning phase. The PTO then provides inputs to the RTO/LTO to be included in the PI/SOC process or the MOU. The responsibilities of the RTO/LTO and PTO should be clearly defined in the PI/SOC or MOU.

Governing Document: AFI 99-103, AFMCI 99-103.

3.3.14. System Program Manager (SPM).
DEFINITION: The SPM is the individual responsible for the life-cycle management of a system or commodity and vested with full authority, responsibility and resources to execute an approved acquisition or sustainment program.

DISCUSSION: The weapons system SPM has the configuration control authority for their respective weapon systems. The SPM may delegate configuration control authority, modification engineering authority, and modification approval authority only to AFMC test centers or AFRL for the purpose of accomplishing T-2 modifications on test center or laboratory assigned and possessed aerospace vehicles. In order for AFRL to be the configuration control authority for a T-2 modification, the appropriate SPM must delegate this authority to AFRL.

Governing Documents: AFMCI 21-126.

3.3.15. Spectrum Management.

DEFINITIONS:

RF Spectrum Supportability: Federal law and US directives prescribe that electromagnetic emitters must have RF spectrum supportability prior to contract approval.

Equipment allocation, also referred to as spectrum certification, is the process of reviewing the equipment characteristics to determine realistic supportability expectations to include conformance with the international and national allocation tables and electromagnetic compatibility (EMC) standards.

Frequency assignment is the authorization given by an administration for a radio station to use a RF or RF channel under specified conditions.

Electronic Warfare (EW) clearance is the authorization given by an administration for the conduct of electronic attack under specified conditions.

DISCUSSION: Equipment allocation is accomplished by submitting a DD Form 1494, *Application for Equipment Frequency Allocation*. The DD Form 1494 documents the transmitter, receiver, and antenna technical characteristics and is required for all RF emitters unless specifically exempt. The technical data is used to determine whether the

equipment conforms to international and national allocation tables and international, national, and DoD EMC standards. AFI 33-118, *Electromagnetic Spectrum Management*, and AFMAN 33-120, *Electromagnetic Spectrum Management*, provide specific guidance on how to request equipment certification and when equipment certification is required. The requirement for equipment certification is also included in DoDD 5000.1, *The Defense Acquisition System*, and DoDI 5000.2, *Operation of the Defense Acquisition System*. The DD Form 1494 is also used to accomplish host nation coordination if the system is intended for operation outside the US and Puerto Rico. Equipment certification can be a lengthy process; therefore, it is essential the certification process begin as early as possible.

When considering RF spectrum supportability, users must take into account the requirement for equipment allocation and frequency assignments. DoDD 4650.1, *Policy for Management and Use of the Electromagnetic Spectrum* states, "All DoD components shall obtain RF spectrum guidance for communications-electronics systems from the Military Communications Electronics Board (MCEB) as early as possible. MCEB guidance must be obtained before assuming contractual obligations.

Frequency assignments are required prior to operation of all RF devices unless specifically exempt. Refer to AFI 33-118 and AFMAN 33-120 for guidance. The frequency assignment provides the conditions under which the equipment must operate. RFs are shared between many users; therefore, it is important to abide by the conditions of the assignment to ensure interference is not caused to other authorized users.

Frequency assignments can be made on a permanent or temporary basis and is dependent on the user's requirement.

Permanent frequency assignments are made for an indefinite period but must be reviewed every five years. The Air Force Frequency Management Agency (AFFMA) requires 60 days to process a permanent assignment. Additional lead-time will be required for all actions requiring coordination with the Federal Communications Commission (FCC) or the Federal Aviation Administration (FAA). To obtain a permanent assignment, the user must submit a frequency request to the appropriate frequency manager who will forward the request through channels to the AFFMA. Once a user no longer requires the frequency assignment, the assignment must be deleted from the radio frequency authorization (RFA).

Temporary frequency assignments are made for periods of less than five years and are processed based on the length of time the assignment is needed. For temporary assignments required for periods greater than 90 days but less than 5 years, the AFFMA requires 60 days to process the assignment. Temporary assignments for periods 90 days or less require 30 days to process the assignment. To obtain a temporary frequency assignment, the user must submit a frequency request to the appropriate frequency manager who will forward the request through channels to the AFFMA. Temporary assignments for 90 days or less can be extended once for an additional 90-day period; however, users must submit another frequency request indicating the new time period. Without the submission of a frequency request extending the time period, the authority to operate will terminate upon the expiration date of the assignment. Temporary frequency requirements for

overseas (not Continental United States [CONUS]) require a minimum of 90 days to process. Any request that does not have sufficient time will not be processed.

EW clearance is required prior to activating any jamming, spoofing, countermeasures, or threat simulator capability. In some cases, both a temporary assignment and an EW clearance is required, such as when a test is conducted to see if an EW device will properly engage a signal from another radiating source. Customers should realize that the entire tuning range of an EW device is seldom approved, frequency channels within government bands are easier to coordinate, and there are normally conditions applied to EW activity. Conditions applied to an EW activity may include reduced power, reduced antenna gain, or use only during late night or early morning hours. The process takes about five months and approval is normally limited to not more than one year.

All users should coordinate at the beginning of the program with the appropriate spectrum management office to ensure spectrum supportability will be available when needed, even if a contractor is intending to use a non-DoD spectrum. Some spectrum managers who are contractors charge for their services. The list of spectrum management POCs is shown in Attachment 7.

Governing Documents: DoDD 4650.1, DoDD 5000.1, DoDI 5000.2, AFI 33-118, AFMAN 33-120.

3.3.16. TEMP.

DEFINITION: The TEMP is the top level summary test management document covering all phases of testing. It integrates T&E with the overall acquisition strategy, funding, resources and schedule and other program documentation into an overall T&E strategy.

DISCUSSION: The TEMP is the basic planning document for all T&E related to a particular acquisition program and is used in planning, reviewing and approving T&E. The

TEMP integrates critical issues, test objectives, evaluation criteria, program characteristics, responsibilities, resources and schedules for T&E. It is updated prior to major milestones, basic program changes, or when there have been significant changes to the program.

TEMPs are usually done for acquisition programs. They are very seldom required for laboratory efforts, but there have been occasions when laboratory management required a TEMP or the PM self initiated a TEMP. See the *Defense Acquisition Guidebook,* **http://akss.dau.mil/DAG/**, for details about content and format.

Governing Documents: *Defense Acquisition Guidebook,* AFI 99-103.

3.3.17. Test Representatives (TESTREP).

DEFINITION: TESTREP are trained, experienced test professional positions assigned at all AFMC acquisition logistics centers and product centers. They are AF Test Pilot School (TPS) graduates or have at least four years of test experience at an AFMC test center.

DISCUSSION: The TESTREP is the primary agent at the product and logistics centers for networking between the center and the rest of the AF T&E community. The TESTREP can, if requested, provide the AFRL PM with guidance and assistance on operational planning of the program. They can, if requested, act as the operational team member on AFRL CCBs, SRBs, and TRBs.

HQ AFMC/A3 manages the TESTREP program. Contact HQ AFMC/A3F, DSN 787-8223 for additional TESTREP information.

Governing Documents: AFMCI 99-103.

3.3.18. Use of Government and Non-Government Test Facilities.

DEFINITION: To secure test and evaluation ranges and facilities, test planners must contact potential test sites early in the program to obtain estimates of cost and availability.

DISCUSSION:

Use of Government Test Facilities: Testers will take full advantage of existing investments in DoD ranges, facilities, and other resources, including the use of embedded instrumentation. Test teams should plan to use AF test capabilities first, followed by MRTFB facilities, followed by non-DoD government facilities.

Use of Non-Government Facilities: Contractor facilities should only be used when government facilities are not available, cannot be modified, are too expensive, or are impractical to use.

Governing Document: AFI 99-103.

Chapter 4

TEMPORARY 2 MODIFICATIONS

4.1. Classes of Modifications.

DEFINITION: Types of modifications made to aerospace vehicles.

DISCUSSION: Prior to 1991, the AF defined five classes of modifications to aerospace vehicles, which were divided between AFMC and ASC. With the combination of the two commands, the AF now recognizes three classes of modifications.

- Temporary-1 (T-1) modifications, to provide increased capability for a special mission, temporarily change, add, or remove equipment to provide increased capability for a special mission. T-1 modifications cannot be on a system for more than one year without approval from HQ USAF (HQ USAF).
- T-2 modifications are temporary modifications required to support research, development, test, and evaluation (RDT&E). Unless a permanent (P) modification has been initiated or a waiver to AFI 21-101, *Aircraft and Equipment Maintenance Management* has been granted, the modified items should be returned to their original configuration immediately after test completion. T-2 modifications were previously called Class II modifications.
- P modifications make permanent changes to correct safety or materiel deficiencies, to improve reliability and maintainability, or to add, increase or remove capability. They may also be retrofits to systems that were produced before the approved change was incorporated into the production line.

Governing Document: AFI 21-101, AFMCI 21-126, AFMC Policy Directive (AFMCPD) 63-4, *Software Requirements Review Process.*

4.2. Temporary 2 Modifications.

Note: See **Section 4.7** for T-2 Modifications to UAVs (smaller than Predator)/Radio Controlled Vehicles.

DEFINITION: T-2 modifications are configuration changes that support R&D, design changes to existing T-2 modifications or developmental T&E programs or in-service testing of systems or equipment.

DISCUSSION: T-2 modifications are temporary hardware or software changes or alterations to aerospace vehicles (aircraft, guided weapons, drones, remotely powered vehicles, UAVs, radio control model (R/Cs), and missiles other than strategic), airborne support equipment, external and internal stores, subsystems, components, or support equipment that is governed by TOs that interface with an aerospace vehicle. These temporary changes or alterations may be installed only for the duration of the flight test unless revalidated or waivered. Carriage of uncertified

aircraft/stores combinations for other than certifying the store is considered a T-2 modification. Refer to the SEEK EAGLE discussion in **Section 4.5** for further store certification information.

All T-2 modifications will be classified as either major or minor.

- Major modification - involves a high degree of technical uncertainty when:

  - There are substantial changes in any one or more of the critical areas of primary structure, propulsion subsystems, avionics systems, software, aerodynamics, stability and control or
  - Available technical data or analytical techniques are insufficient to provide an adequate basis for sound engineering design of the modification and sufficient testing has not been accomplished to resolve the technical uncertainties.

- Minor Modification - If not classified as major, modifications are minor.
- The CCB chairman has the authority to classify modifications.

T-2 modifications for laboratory programs can be accomplished several ways:

- Contractor or AFMC test agency installed modification on a vehicle assigned to the test center: In this case, the SPM for the weapon system has modification approval authority and classification authority. The SPM is responsible for the T-2 modification process. However, the SPM may delegate this authority to the test center. The test center will know who has the approval authority for their aircraft.
- Contractor installed modification on a GFP: In this case, the SPM for the weapon system has modification approval authority and classification authority. The SPM is responsible for the T-2 modification process. However, the SPM may delegate this authority to the laboratory or a test center.

Contractor installed modification on a contractor vehicle: For non-AF aircraft, the FAA (or responsible government agency) is the approval authority. The contractor is accountable under the Federal Aviation Regulations (FARs) and the FAA (or responsible government agency) for all modifications made to non-AF aircraft. If the USAF has mishap accountability or has AF resources involved, the AF should participate in the contractor's modification approval process.

Additional information:

- For all major T-2 modifications, the responsible program SPM provides an Independent Modification Review (IMR). Refer to **Section 4.3.9** for more information.
- For lease or loan aerospace vehicles, the lease or loan agreement will specify who has modification approval authority.

There are three documents that should be referenced in a contract for a T-2 modification:

Use DID DI-MISC-81562 to obtain contractor data. Different data are required for the two design reviews. The Part I data package is the data to support the PDR; this is the proposed

design. The Part II data package is the data to support the CDR; this is the detailed design, and, after CCB approval, it becomes the final design. Any design changes after CDR approval require additional CCB review and approval. The current DI-MISC-81562 does not specify what data is required for each data package. Refer to **Attachment A11** for a list of the data required in Part I and in Part II data packages.

- Use MIL-STD-27733 to identify marking, safety and configuration control practices for T-2 modifications. The standard marking requirements provide the operational and maintenance community the ability to easily identify test and associated equipment installed in aerospace vehicles. The standard also addresses unique safety concerns encountered with T-2 modifications such as component and vehicle safety of flight certificates.
- Use MIL-STD-882D to determine the safety program requirements. Tailor the document to the complexity of the modification and the degree of risk created by the modification. The SOW will specify those safety program tasks required for the modification or equipment (Group B) development. Make sure the appropriate tasking is included for both modification and demodification when use of known or potentially hazardous agents is being considered.

Governing Documents: AFI 21-101, AFMCI 21-126.

4.3. Modification Approval Authority – AFRL.

If AFRL owns the aerospace vehicle or is granted modification approval authority by the weapon system PM, AFRL is responsible for conducting the T-2 modification process. Modifications are managed via AFMCI 21-126. The following sections discuss this process. For further assistance, contact the AFRL Flight T&E office.

Both major and minor modifications require the establishment of a CCB and the conduct of specific reviews and inspections. The required reviews and inspections are:

- PDR (Optional for minor modifications).
- CDR.
- TRB.
- Physical Configuration Inspection (PCI).
- Post Modification Acceptance (PMA.)
- SRB.
- Flight Readiness Review (FRR).

This is the recommended order of occurrence. However, due to unique program situations, the order may be changed. Refer to each review or inspection section for a detailed discussion of that action. The CCB chairman is the modification approval authority. Refer to the section on CCB for instructions on identifying the chairman, establishing the board and the CCB responsibilities. In addition, if the T-2 modification is major, an IMR by the weapon system SPM is required.

The technical and safety reviews are part of the test plan review and approval process. However, they are included here since the test plan for the program usually includes modification items, and the test plan must be approved before release for flight is granted.

Another way to view these events is by review and inspection function:

Overall Grouping of T-2 Modification Events

Contractual Actions	Design Reviews	Installation Inspections	Test Plan Reviews	Flight Release
GFP Vehicle MIL-STD-27733 DI-MISC-81562 MIL-STD 882D	PDR CDR TRB*	PCI PMA	TRB* SRB	FRR Temporary Final

* The TRB is both a design review and a test plan review.

4.3.1. CCB Chairman.

DEFINITIONS:

The CCB functions as an advisory body to the CCB chairman.

The CCB chairman is the T-2 modification approval authority and may approve deviations to normal procedures to accomplish modifications.

DISCUSSION: The weapons system SPM is the T-2 modification approval authority for all aerospace vehicles under their control. This applies to all T-2 modifications to all AF aircraft including AFMC-assigned, possessed, loaned, or leased aerospace vehicles.

The SPM may delegate CCB, modification engineering authority, and modification approval authority to an AFMC test center or laboratory. If AFRL receives this authority, AFRL is responsible for conducting the modification process. If AFRL owns the aerospace vehicle, AFRL is responsible for conducting the modification process. If the modification to the aerospace vehicle is minor, the AFRL director, or their designated representative, is the CCB chairman. If the modification to the aerospace vehicle is major, AFRL/CC appoints the CCB chairman.

The CCB chairman's responsibilities include:

- Determine whether the modification is major or minor.
- Assemble the CCB.
- Conduct the T-2 modification process (contact the AFRL T&E office for assistance).

- Ensure the T-2 modification documentation is maintained. See AFMCI 21-126, **Section 8.2**, for documentation instructions.
- Certify the safety of flight of the modification through the issuance of a flight release.

  - AFMC Form 273, *Final Release for Flight Certificate*
  - AFMC Form 243, *Temporary Release for Flight Certificate*

- Refer to AFMCI 21-126, **Para** 7.3, for additional responsibilities.

The CCB chairman, with the assistance of the AFRL Flight T&E office, assembles the CCB with the following minimum membership:

- Safety.
- Maintenance/logistics.
- Engineering.
- Operations.
- Quality assurance (QA).
- RTO/LTO.
- Contracting.
- CM.
- Others tailored to the individual program.

The CCB chairman issues letters to the proposed members to authorize membership to the CCB. It is best to contact the proposed members and get their concurrence before issuing the letters. See the sample CCB membership letter in **Attachment A4.2**. The CCB remains in effect until disbanded by the chairman, usually after the FRR.

Governing Document: AFI 21-101, AFMCI 21-126.

4.3.2. PDR for Modifications to an Aerospace Vehicle.

DEFINITION: The PDR is a formal technical review of the basic approach for a modification design contained in the Part I data package. It will be held after the preliminary design efforts are done, but before start of detailed design.

DISCUSSION: Laboratory PMs and engineers become involved with PDRs when participating in a T-2 modification to an aerospace vehicle. The PM should ensure that copies of the Part I data package are provided to CCB members at least 10-14 days prior to the review. This will allow the member's time to study the data and be prepared to follow the design briefings and ask questions to resolve concerns. See **Attachment A11** for a list of Part I data package contents.

The CCB chairman chairs the PDR. The IMR will be invited for major modifications. The CCB chairman assigns an individual to take minutes at the PDR and prepare them for signature after the PDR. Attachments to the minutes should include:

- Agenda.
- AFMC Form 244, *T-2 Modification Configuration Control Board Directive.*
- AFRL letter to contracting.
- Attendance list.
- AFRL briefing slides.
- Contractor briefing slides.
- Safety Validation Item/Request for Information (SVI/RFI) forms.

During the PDR the government members may have unresolved questions or concerns that they feel should be further addressed by the contractor. The government PM provides AFRL Form 16, *Safety Validation Item/Request for Information,* to record these questions or concerns. See the SVI/RFI write-up, **Para** 4.3.8, for information about the form and its use.

The CCB chairman may choose to approve the Part I data package at the PDR or hold a separate meeting later to approve the package. The CCB chairman approves the Part I data by issuing two documents:

- AFMC Form 244
- Approval letter to AFRL contracting (if required)

The PM sends these documents to contracting.

See **Attachment A3.1** for a sample PDR agenda.

Additional items for consideration:

- If the T-2 modification is major and with contracted engineering design, then the AFMC organization awarding the contract will conduct a PDR and a CDR.
- When aircraft with contracted modifications are to be flight tested by an AFMC test organization, that test organization must take part in the PDR and CDR. The test organization will take part in other reviews as requested by the CCB authority.
- If the modification is minor and with contracted engineering, a PDR is desirable and CDR is required.
- For those modifications with in-house design, a design review will be established.

Governing Document: AFMCI 21-126.

4.3.3. CDR for Modification to an Aerospace Vehicle.

DEFINITION: The CDR is a formal review of the detailed design of a modification. It will be conducted before fabrication or production design release so the detail design solutions, as reflected in Part II, satisfy performance requirements set by the PDR. Incremental reviews may be conducted instead of a single CDR.

DISCUSSION: A CDR will normally address changes to scope, features, and capabilities from those presented at the PDR. The CDR will also identify design and operating requirements or specifications not satisfied by the proposed design. CCB approval of the CDR or the final in-house design review establishes the design baseline of the modification. The final design must include all information necessary to fabricate, install, functionally checkout, and certify safety of flight of the modification and vehicle.

Laboratory PMs and engineers become involved with CDRs when participating in a T-2 modification to an aerospace vehicle. The PM should ensure that copies of the Part II data package are provided to the CCB members at least 10-14 days prior to the review. This will allow the member's time to study the data and be prepared to follow the design briefings and ask questions to resolve concerns. See **Attachment A11** for a list of the Part II data package contents.

The CCB chairman chairs the CDR. The IMR will be invited for major modifications. Usually the chairman and the PM meet prior to the CDR to discuss how the review will be presented and conducted. The CCB chairman assigns an individual to take minutes at the CDR and prepare them for signature after the CDR. Attachments to the minutes should include:

- Agenda.
- AFMC Form 244.
- AFRL letter to contracting.
- Attendance list.
- AFRL briefing slides.
- Contractor briefing slides.
- SVI/RFI forms.
- CCB Chairman Appointment Letter.

During the CDR the government members may have unresolved questions or concerns that they feel should be further addressed by the contractor. The government PM provides the AFRL Form 16, to record these questions or concerns. See the SVI/RFI write-up, **Para** 4.3.8, for information about the form and its use. Once the design is approved by the CCB, any changes to that design must be submitted to the CCB for approval.

The CCB chairman may choose to approve the Part II data package at the CDR or hold a separate meeting later to approve the package. The CCB chairman approves the Part II data by issuing two documents:

- AFMC Form 244.
- Approval letter to AFRL contracting (if required).

The PM sends these documents to contracting.

See **Attachment A3.1** for a sample CDR agenda.

Normally, fabrication and installation begin after the CDR for contracted modifications or after an internal design review for in-house modifications.

Items for consideration:

- If the T-2 modification is major and with contracted engineering design, then the AFMC organization awarding the contract will conduct a PDR and a CDR.
- When aircraft with contracted modifications are to be flight tested by an AFMC test organization, that test organization must take part in the PDR and CDR. The test organization will take part in other reviews as requested by the CCB authority.
- If the modification is minor and with contracted engineering, a PDR is desirable and CDR is required.
- For those modifications with in-house design, a design review will be established.

Governing Document: AFMCI 21-126.

4.3.4. PCI.

DEFINITION: A PCI is a detailed inspection of the modification to ensure it has been made and installed as prescribed in the modification package.

DISCUSSION: Laboratory personnel will become involved with a PCI when doing a T-2 modification, the corresponding demodification, or when revalidating residual components of a previous modification on a GFP aircraft. QA inspections performed on a routine basis during the course of the modification are not PCIs.

The CCB chairman is responsible to ensure a PCI is conducted. The chairman appoints, in writing, a PCI team leader. The team leader may assemble a PCI team or arrange for the government representative at the contractor's plant to conduct the PCI and report the results to him.

The Defense Contract Management Agency (DCMA) has personnel assigned in several districts who have the ability to provide field technical and administrative support to the prime contracting agency. QA is one area of support that can be very useful to laboratory PMs for assisting on PCI and follow-up on PCI action items on T-2 modifications. This support may be obtained by submitting a written request to the responsible contract administration office under the appropriate DCMA office for the prime contractor. To determine the appropriate DCMA office for the prime contractor, refer to the DCMA home page (http://www.dcma.mil) that provides an index of offices and their responsible areas.

Also, your local directorate logistics office can assist you in determining which contract administration office to contact when preparing the request.

A PCI must be conducted on the modification before it is released for testing operation. It includes, as a minimum, an inspection of fabricated hardware and documentation to include sketches, engineering drawings, engineering changes, maintenance instructions, work

cards, and weight and balance mass properties. (Consider the PCI as a QA inspection to validate conformance to standards of quality, workmanship, military specifications (MIL SPECS), and TOs.

There are several types of PCIs:

- Partial PCI: Conducted before the modification is completed. This usually occurs when the aircraft will be flown but a substantial amount of the modification has not been completed. A PCI is conducted on the installation that has been accomplished, and incomplete work must be secured for flight and power removed from the modification.
- Final PCI: Conducted after the modification is completed. This is the usual type of PCI conducted on laboratory T-2 modification programs.
- On-going PCI: Conducted by AF representatives from the DCMA office at the contractor's plant as the installation is being accomplished to ensure the modification is done as stated in the drawings and documentation. This inspection is conducted to assist the team who will perform the final PCI. It is done on those items that will be enclosed, buried, or not readily accessible, making it difficult to examine during the final PCI. The results of this inspection are provided as inputs to the final PCI. The DCMA inspector is a member of the PCI team.
- Phased PCI**:** Conducted to verify modification progress at a certain point in the installation. For example: a phased PCI may be requested to confirm the structural modification prior to proceeding further. This PCI is accomplished as a part of the formal PCI and recorded, accordingly. (Caution: do not confuse this inspection with routine QA inspections done by the on-site field representative.)

Team size for the PCI can vary depending on the complexity of the modification. The team usually consists of members from safety (system and flight), maintenance, configuration control, QA, the RTO and LTO, and the AF field office. The IMR team will be invited for major modifications.

For a typical T-2 modification PCI, the team assembles at the contractor's plant, and, after briefings by the contractor and AF field representatives, begins the inspection. The contractor ensures all drawings and documentation are readily available for review. Any noted discrepancies are documented on AFRL Form 18, *Physical Configuration Inspection/Post Modification Acceptance (PCI/PMA) Discrepancy Form* and given to the team leader. Many times contractor maintenance personnel, who are available at the aircraft, can correct minor discrepancies on the spot. After the inspection is completed, the team has a "government-only" meeting to discuss and finalize the content of the discrepancies. The discrepancies are recorded on two forms:

- AFRL Form 18: This internal AFRL form is used to record all T-2 modification related discrepancies found during the PCI and is included in the team leader's report to the CCB.
- Air Force Technical Order (AFTO) Form 781A, *Maintenance Discrepancy and Work Document*: This form is for documenting official aircraft discrepancies. The

form stays with the aircraft and becomes part of the official corrective action records. The discrepancies do not have to be modification related. There must be an official response from the crew chief, a designee, or a quality-control inspector. Discrepancies found during the PCI are reviewed and the ones deemed safety of flight or otherwise critical are noted on the AFTO form. The QA member of the PCI team will determine which discrepancies are serious enough to be recorded on the AFTO form. The QA member will also be able to correctly complete the AFTO form.

The team then meets with the contractor to review and discuss the discrepancy write-ups. Unless there are some unusual problems that would require a revisit by some team members, follow-up action to verify the fix of any discrepancies can be done by the AF field representative to the team. The PCI is documented on the AFMC Form 272, *Physical Configuration Inspection (PCI) Report,* with the write-ups (AFRL Form 18) attached. Indicate which, if any, discrepancy write-ups were transferred to an AFTO form. PCI findings are reported to the CCB and must be considered before the release of flight or issuance of final safety of flight certification.

Note*:* Regarding the AFTO Form 781A; the QA team member can provide guidance on making the proper comments and marking inputs on the form. The markings used are as follows:

- Red dash: Special inspection or operations check is due.
- Red diagonal: Unsatisfactory condition exists on equipment but not sufficiently urgent or dangerous to warrant grounding of vehicle.
- Red x: Equipment is unsafe for flight.

See **Attachments A3.2** and **A4.3** for a sample letter establishing a PCI team and a sample PCI agenda.

Governing Documents: AFMCI 21-126, AFI 21-101, TO 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures.*

4.3.5. PMA.

DEFINITION: The PMA is a power up ground test and functional checkout of the equipment and modification to the maximum extent possible. During this system checkout,

operation, maintenance, and inspection instructions will be evaluated for adequacy, and electromagnetic interference (EMI) and EMC test will be accomplished as required.

DISCUSSION: The PMA will normally be completed prior to or combined with the final PCI and before issuance of a flight release. The PMA consists of a ground-based checkout of the modification (when possible) to verify the following:

- System operation.

- Completion of EMI and EMC tests of the modification.
- Modification satisfies the user's requirements.
- Adequacy of the operation, maintenance, inspection instructions and associated work cards.

The CCB chairman appoints, in writing, an individual, often the PCI team leader, to head up the PMA inspection. Participants are often the same as the PCI members. The IMR will be invited for major modifications. For a typical T-2 modification, the team assembles at the contractor's plant, and, after briefings by the contractor and AF field representatives, begins the inspection. The contractor ensures all documentation is readily available for review. Any noted discrepancies are documented on AFRL Form 18 and given to the team leader. Many times contractor maintenance personnel, who are available at the aircraft, can correct minor discrepancies on the spot. After the inspection is completed, the team has a "Government-only" meeting to discuss and finalize the content of the discrepancies. The discrepancies are recorded on two forms:

- AFRL Form 18: This internal AFRL form is used to record all T-2 modification related discrepancies found by the team during the PMA and is included in the team leader's report to the CCB.
- AFTO Form 781A: This form is for documenting official aircraft discrepancies. The form stays with the aircraft and becomes part of the official corrective action records. The discrepancies do not have to be modification related. There must be an official response from the crew chief, a designee, or a quality control inspector. Discrepancies found during the PCI are reviewed and the ones deemed safety of flight or otherwise critical are noted on the AFTO form. The QA member of the PMA team will determine which discrepancies are serious enough to be recorded on the AFTO form. The QA member will also be able to correctly complete the AFTO form.

The team then meets with the contractor to review and discuss the discrepancy write-ups. Unless there are some unusual problems that would require a revisit by some team members, follow-up action to verify the fix of any discrepancies can be done by the AF field representative to the team. The PMA is documented on the AFRL Form 23, *Post Modification Acceptance Report,* with the write-ups (AFRL Form 18) attached. Indicate which, if any, discrepancy write-ups were transferred to an AFTO form. PMA findings are reported to the CCB and must be considered before the release for flight or issuance of final safety of flight certification.

Note: Regarding the AFTO Form 781A; the QA team member can provide guidance on making the proper comments and marking inputs on the form. The markings used are as follows:

- Red dash: Special inspection or operations check is due.
- Red diagonal: Unsatisfactory condition exists on equipment but not sufficiently urgent or dangerous to warrant grounding of vehicle.
- Red x: Equipment is unsafe for flight.

See **Attachment A3.3** for a sample PMA agenda.

Governing Documents: AFMCI 21-126, AFI 21-101, TO 00-20-1.

4.3.6. FRR.

DEFINITION: The FRR is a review required to be conducted prior to first flight for newly developed systems or significantly modified aerospace vehicles. The purpose is to ensure that all reasonable efforts have been made to minimize risks.

DISCUSSION: The FRR is a gathering of key review individuals to perform a "last look" to ensure all technical and safety matters have been considered and flight testing has been safely and properly planned and coordinated. The IMR will be invited for major modifications.

The FRR board is organized and chaired by the CCB chairman. The purpose of the board is to determine if all modification and safety issues have been addressed and the program is ready to progress to first flight and follow-on testing. The CCB chairman has the authority to release the vehicle for flight. All SVIs must be closed out by the FRR. The CCB chairman determines members to the board. They normally include CCB members and SRB members. IMR members (for major T-2 modifications only), RTO representatives, and DCMA representatives (if FRR held at contractor's plant) are invited to attend. At the conclusion of the FRR, the CCB chairman will decide whether the vehicle is ready to fly. The decision to release the vehicle is based on the CCB process results, the SRB risk assessment, test plan acceptance by the TAA, and, for major modifications, the safety of flight recommendation from the IMR. To release the vehicle to fly, the CCB chairman will issue either a final or temporary release to fly. See the temporary or final release for flight write-up, **Para** 4.3.7. After signing the release for flight and AFRL Form 22, *Flight Readiness Review,* the CCB chairman will send AFRL contracting a letter recommending that the contractor may initiate flight testing. Attached to the letter shall be the IMR letter of recommendation for major modifications.

See **Attachment A3.6** for a sample FRR agenda.

Governing Document: AFMCI 99-103.

4.3.7. Flight Release.

DEFINITION: There are two types of flight releases:

- Final Flight Release: Aircraft for which a final modification, design baseline change, or demodification has been conducted will be certified as airworthy by the CCB chairman through the issuance of an AFMC Form 273.
- Temporary Release for Flight: When a final flight release cannot be issued because of an incomplete modification, design baseline change, or demodification not affecting safety of flight or a program requirement, then the responsible CCB

chairman may issue an AFMC Form 243 of up to 180 days. The responsible CCB chairman may issue subsequent temporary flight releases as deemed necessary. Temporary flight releases cannot be utilized to retain residual T-2 modifications beyond 180 days after flight testing is completed.

DISCUSSION: After satisfactory completion of all required T-2 modification reviews and closure of SVIs, the CCB chairman signs a release for flight, either final or temporary, for the modified vehicle. Only after the flight release is signed may the modified vehicle be released to fly. For major modifications, the IMR will provide recommendations to the CCB chairman for release or non-release of the vehicle.

Governing Document: AFMCI 21-126.

4.3.8. SVI/RFI.

DEFINITION: The formal identification and documentation of data requests and issues affecting flight safety.

DISCUSSION: AFRL Form 16 is generated by government personnel during various government reviews, inspections, and meetings with a contractor. The government member generated forms are presented to the contractor for resolution.

- The RFI is a request for additional information from the contractor to clarify or expand what the contractor has presented.
- The SVI is a concern that affects the safety of flight.

During reviews or on-site meetings, concerns or data requests will be resolved on site, if possible, and noted in the meeting minutes. Any concern or request that is not resolved on site will be formally documented on the AFRL Form 16. All government personnel (CCB members, IMR members, and other government reviewers) use this form. Both SVIs and RFIs may be generated during government reviews and meetings with the contractor. At the government caucus after the contractor presentation, the team leaders will meet to discuss these forms. They will review each write-up to ensure there is no duplication of items, validate the need for resolution, log the items, establish a response date, and identify a government POC responsible for reviewing the contractor response. The logged SVI/RFI forms will then be given to the PM for disposition to the contractor. Resolution of each SVI/RFI will be accomplished when the assigned POC accepts the response provided and closes the action item. Closure may be receipt of the required data, correction of a safety problem, or providing an acceptable closure plan.

4.3.9. IMR.

DEFINITION: The IMR is a technical review of the major modification from a safety of flight point of view. It is conducted by a review team chartered to assess flight readiness in terms of safety risks as well as the modification design itself, relative to flight safety, of a

major T-2 modification prior to first flight. Its mission is to provide the PM and CCB chairman with an independent technical and safety risk assessment.

DISCUSSION: All major T-2 modifications require an IMR by the responsible system PM. Minor modifications do not require an IMR. The IMR provides an independent safety risk assessment of the following:

- Modification's engineering design (including software changes).
- Impacts on weapon system's characteristics, systems and flight safety.
- Drawings.
- Analyses.
- Modeling and simulation.
- Test plans.
- Data.
- Related flight manuals, operating and maintenance instructions, and changes thereto.
- Demodification plan with associated analyses and drawings.
- This detailed review will concentrate on those areas of the modification that are the basis for declaring the modification major.

After the CCB chairman declares the modification major, the AFRL PM will formally request that the SPM initiate the IMR. The PM should take this action prior to the PDR and should integrate the IMR process into the program. The PM will invite the IMR team to participate in the PDR, CDR, TRB, PCI, PMA, SRB, and FRR. The IMR recommends safety of flight approval or disapproval to the CCB. The recommendation should be presented to the CCB chairman prior to the FRR.

Additional considerations:

- The AFRL PM is responsible for all costs (including temporary duty [TDY]) incurred by the IMR team. This additional financial responsibility must be recognized at the start of fiscal planning.
- The AFRL PM should ensure that the IMR and CCB chairmen meet as soon as they are appointed to establish the working relationship between the two teams. It has been very helpful to document this relationship in a charter because personnel involvement is often changed during the program, and the charter keeps the relationship and focus consistent. The charter should be negotiated before the PDR if possible. **Attachment A5.1** contains a sample charter outline.
- The IMR and CCB chairmen together should review all the SVIs and RFIs generated by both teams at each meeting prior to formally submitting them to the contractor. See the SVI/RFI write-up for the processing actions required before submission.

Governing Documents: AFMCI 21-126.

4.4. Modification Approval Authority – Other.

4.4.1. AFMC Test Center.

The SPM often gives modification approval authority to the AFMC test centers for aircraft possessed by them. The test centers will know who has modification approval authority for their aircraft. Whoever has modification approval authority is responsible to conduct the T-2 modification process. If the T-2 modification is major and with contracted engineering design, then the AFMC organization awarding the contract will conduct a PDR and a CDR. If the modification is major, an IMR must be conducted.

4.4.2. AF non-AFMC.

When the AFRL PM decides to use AF but non-AFMC vehicles, such as Air National Guard aircraft, for their program and to have a contractor or the vehicle owner install a modification, the following process is used to obtain the vehicle and approve the modification.

- Contact the AFRL Flight T&E office or HQ AFMC/A3O for assistance in locating the aerospace vehicle. When an aerospace vehicle is located for use on the program, the AFRL PM must also prepare an MOU with the organization owning the vehicle for the test program and modification (if a modification is required). Contact the AFRL T&E POC for MOA preparation assistance.
- The AFRL PM may be required to submit an AF Form 1067, *Modification Proposal*, to the program office (Acquisition Squadron, Group, etc...) or ALC owning the vehicle to obtain approval for the modification. Contact the AFRL T&E office for assistance in locating the correct program office or ALC and for preparation of the AF Form 1067 and MOU.
- If the T-2 modification is major and with contracted engineering design, then the AFMC organization awarding the contract will conduct a PDR and a CDR.
- The SPM always has modification approval authority but may delegate it to AFMC test centers or AFRL.

Governing Document: AFI 63-1101, *Modification Management.*

4.5. Stores.

DEFINITION: Any item suspended from a standard weapons station or in the bomb bays of an aerospace vehicle (e.g. bombs mounted on pylons, electronic countermeasure pods, missiles, external fuel tanks, and instrumentation pods and their suspension equipment).

DISCUSSION: Laboratory PMs are concerned with stores since carriage of uncertified aircraft/stores combinations for other than certifying the store is considered a T-2 modification. The PM is responsible for obtaining a flight clearance for all uncertified stores. There are two options for obtaining this clearance.

- The PM must contact the SEEK EAGLE office at Eglin AFB. Among other responsibilities, the SEEK EAGLE office manages stores separation certification for all AF aircraft. When the test aircraft is highly modified, as the AFRL in-flight research aircraft, they will often recommend that the contractor, who is familiar with the modified configuration, prepare the certification. However, the configuration certification must always have SEEK EAGLE approval. To contact the SEEK EAGLE Office:

  - DSN 872-9813
  - **http://www.eglin.af.mil/afseo**

- All munitions, suspension and release equipment, or munitions test equipment not currently in the USAF inventory or inventory items that require modification to support testing require safety certification by the USAF Nonnuclear Munitions Safety Board. Contact the Air Armament Center System Safety Office (AAC/SES) at DSN 872-7340 or DSN 872-7306.
- The PM may request the contractor or another government organization provide data and information for the government to conduct the necessary reviews. The contractor may recommend certification.

The CCB will include the stores flight clearance as part of the review and approval process of the T-2 modification.

Governing Documents: AFI 63-104, *The SEEK EAGLE Program*; AFMCI 21-126, AFI 91-205 *Nonnuclear Munitions Safety Board*.

4.6. Safety of Flight Certification.

DEFINITION: Certification that sufficient engineering or flight tests have been done to ensure the safe flight of a T-2 modified aerospace vehicle or T-2 modification component within a specified envelope. It will also certify crashworthiness and identify any flight restrictions imposed as a result of the item.

DISCUSSION: The term "safety of flight" is a new term that developed with the OSS&E philosophy. Previously the term used in the T-2 modification process was "airworthiness certification". Now, under OSS&E, only the SPM can certify the "airworthiness" of a vehicle. However, the SPM is indicating airworthiness certification for the operational fleet and operational conditions. The term "safety of flight" is now used to indicate that the T-2 modification and modified vehicle are safe for flight test needs but not intended for the mission design series (MDS) fleet and full operational use, upgrades, and modifications.

A component certificate of safety of flight shall be provided for all equipment (installed, carry-on, or portable) on an aerospace vehicle. For AF and AFMC vehicles, use AFMC Form 3, *Component Safety of Flight Certificate*. If the vehicle in use is FAA certified, use FAA or equivalent component certification. The contractor may provide a declaration of safety of flight, usually a letter. The certificate shall indicate that the equipment is safe to operate in the intended environment at design conditions. The certificate shall also identify any associated hazards and

limitations. An aerospace vehicle certificate of safety of flight shall also be provided prior to flight of a modified vehicle; the certificate shall identify any flight restrictions imposed as a result of the modification(s). The following paragraphs discuss who is responsible to provide the safety of flight certification.

- Contractors shall be required to provide the component and vehicle certificates of safety of flight for items developed under contract through MIL-STD-27733 and DI-MISC-81562.
- For items installed on AF aerospace vehicles: The government PM, initiating government organization, or the equipment providing government organization will provide the safety of flight and crashworthiness of the Group B components or identify associated hazards and limitations. The component certification will be documented using the AFMC Form 3. Final determination of the safety of flight rests with the T-2 modification CCB chairman.
- For items installed on other DoD, FAA or National Aeronautics and Space Administration (NASA) owned aerospace vehicles: The PM shall provide a component certificate of safety of flight for all equipment. The certificate shall indicate that the equipment is safe to operate in the intended environment at design conditions. The certificate shall also identify any associated hazards and limitations. The certification is given to the aircraft owner to be kept with the aircraft records.
- For items installed on DoD aircraft with FAA certification: The FAA inspector will certify some or all portions of the installation. The PM must provide safety of flight certification for any remaining items.
- For GFP items installed on contractor aerospace vehicles: The PM shall provide a component certificate of safety of flight for all installed equipment. The certificate shall indicate that the equipment is safe to operate in the intended environment at design conditions. The certificate shall also identify any associated hazards and limitations. The completed certificate is given to the aircraft owner to be kept with the aircraft records. If the aircraft owner chooses to accept items without certification, the acceptance of risk must be documented.

For contractor modifications on contractor aircraft: When there is no GFP involved, the AFRL PM has no requirement to provide a certificate. The modifications must be approved and certified by the FAA. If parts of the modification are not certified by the FAA, the PM must identify these items to the SRB for their consideration.

- For government provided carry-on or portable equipment: Refer to AFI 11-202V3, *General Flight Rules*, **Para** 2.5, for a detailed discussion on what carry-on or portable equipment is permitted under various conditions.

Governing Document: AFPD 62-6, *USAF Aircraft Airworthiness Certification*; AFI 11-202V3, AFMCI 21-126, MIL-STD-27733, DI-MISC 81562

4.7. T-2 Modifications to UAVs (smaller than Predator)/Radio Controlled Vehicles.

DEFINITION: T-2 modifications are configuration changes that support R&D, design changes to existing T-2 modifications or developmental test and evaluation (DT&E) programs or in-service testing of systems or equipment.

DISCUSSION: In the definition of T-2 modifications in **Para** 4.2, modifications to UAVs are clearly included in the configuration control process. Therefore, a CCB must be convened for all modifications to AFRL owned UAVs, remotely piloted vehicles (RPVs), R/Cs and for these vehicles for which AFRL has mishap accountability or liability (hereafter, all types of UAVs, RPVs, and R/Cs will be called UAVs). The CCB process discussed in the previous sections is primarily for full scale aircraft. For the smaller UAVs in AFRL, this process is too cumbersome. The TD director (or their deputy or associate director, if so delegated) owning the UAV approves the CCB chairman. The UAV CCB chairman should be a highly experienced r/c model builder and flyer. The following section discusses the AFRL CCB process tailored for UAVs.

4.7.1. UAV Test Philosophy:

Risk: From a safety perspective, UAV testing is significantly different from manned air vehicle testing for two primary reasons. First, there is no onboard pilot who could make inputs to the UAV who has received multi-sensory feedback (optical, seat-of-the-pants, and aural) that is based on the flight situation of the aircraft. Second, the consequences of structural failure of the aircraft, due to overloading or impact, include only loss of an aircraft and not loss of life. So while the likelihood of damage or destruction of the UAV is intrinsically greater than that of a reasonable manned flying program, board members are generally willing to accept a higher level of risk to the air vehicle than in manned flight. However, there is great resistance to any activity that would place any personnel in risk.

Operational Procedures vs. Maintenance and Repair Procedures vs. Modification: Test personnel will perform a variety of actions on the UAV. These include maintenance, repair, modification, and operations. These are separate functions that must be understood before understanding the role of the CCB. The best way to explain is by a word illustration.

If the test team purchases a commercial-off-the-shelf (COTS) UAV from a vendor, assembles it as directed, and flies it, that is an unmodified vehicle. If the landing gear must be adjusted prior to flight as a normal preflight procedure, that is an operational or checklist procedure. If a worn out landing gear is replaced, that is a maintenance procedure. If the test team crashes the UAV, breaks the left landing gear, and replaces it with an identical landing gear, that is a repair procedure. If the test team decides that the landing gear is too weak to perform their test mission and decides to replace the landing gear with stronger landing gear, they have performed a modification. The differences between these procedures are spelled out in more detail below.

- Operational or checklist procedures are those functions that an operator would routinely perform prior to operations, such as fueling, and checking items such as lubricant levels, effective actuation of flight control surfaces, and deicing

equipment operations. These procedures never change the configuration baseline of the vehicle.

- Maintenance and repair procedures are those functions that are required to keep the vehicle operational, such as replacing tires, replacing engines, or replacing landing gear struts. As with operational/checklist procedures, these procedures never change the configuration baseline of the vehicle. Note that the difference between operational procedures and maintenance procedures can be subtle.
- Modification is the process of changing an established and approved configuration baseline to a new configuration, such as bolting on a GPS antenna, changing the landing gear to support higher landing loads, or changing the flight control system to allow higher pitch rates.

CCB: A CCB is required for any modification. This process ensures that the configuration change will not result in unsafe changes to the structural characteristics or the performance and flying qualities characteristics of the UAV. The CCB is convened by the CCB chairman for the particular project. The CCB chairman is accountable to the SRB to confirm the safety of the modified configuration. The CCB may consist only of the CCB chairman for simple configuration changes. The CCB chairman is appointed in the same way the aircraft CCB chairman is appointed (refer to **Para** 4.3.1). Several AFRL directorates have already appointed CCB chairman to oversee all the UAVs in that directorate, contact the AFRL T&E office to enquire if a chairman has already been appointed for a specific vehicle. After the SRB, TRB, and CCB have been successfully completed, the CCB chairman will release the vehicle for flight by signing the permanent or temporary flight release as discussed in **Para** 4.3.7.

4.7.2. UAV T-2 Modification Process.

The CCB modification approval occurs prior to start of modification. Modification acceptance occurs after completion of the modification but prior to first test event.

The owner of each AFRL UAV is required to maintain a log containing the maintenance or repair and the modifications records. After each modification is completed and prior to first flight, the CCB chairman will review the modification documentation as well as the modified vehicle during inspection. The chairman will accept each modification by signing the AFRL Form 26-1, *AFRL UAV Modification Document,* which will remain in the log. Each log will remain with its vehicle.

Log contents:

- Maintenance or repair records: These actions are recorded on AFRL Form 11, *UAV Maintenance/Repair Log.*
- Modification records: These changes are recorded on AFRL Form 26, *AFRL UAV Modification Log,* for the overall modification log and AFRL Form 26-1 for each individual modification.
- The modification number is defined as:
  - M – modification.

- FY - fiscal year modification accomplished.
- Modification designation - 001, 001A, 002, etc.
- Example:

  - M2003-001 – all modifications for a single program.
  - M2003-001A – revision to an original modification.
  - M2003-002 – all modifications for a new program.

- In addition to the above required records, the vehicle owner may choose to also include a flight log and an inspection log in the vehicle's log.

Note: A modification may also be a P, these also should be recorded on the AFRL forms above.

Governing Document: AFMCI 21-126

Chapter 5

TEST PLANS

5.1. Test Plan.

DEFINITION: A document that details the entire test and how it will be accomplished. Typically, the plan includes test objectives, success criteria, test procedures, data collection process, and build-up conditions.

DISCUSSION: For clarification, in this manual, the term "test" shall include experiments, demonstrations and tests. These tests include all flight tests and any associated ground tests. All tests require an approved test plan. Tests will be conducted according to the approved test plan and changes to the test plan will require further review. Contact the AFRL Flight T&E office for additional guidance.

In July 2006 the 412 OG, 412 TW, Air Force Flight Test Center (AFFTC) assumed operational control of all AFRL flight test planning and flight execution. Refer to **Chapter 6** in this AFRLMAN for a discussion of the additional flight test program requirements to comply with 412 OG.

For most MN directorate flight test programs at Eglin and Holloman ranges, 412 OG has delegated flight authority to the 46 Operations Group (46 OG), 46 Test Wing (46 TW), Air Armament Center (AAC). The AFRL Munitions Directorate (AFRL/MN) programs that report to the 46 OG will follow the guidance in this document, but will replace all 412 OG/TW or AFFTC specific guidance with 46 OG defined processes.

Test Plan Approval: All test plans require a technical and safety review. The organization responsible for the reviews differs with different scenarios that are explained below. If unsure which scenario applies to your program, contact the AFRL Flight T&E office for assistance. Basically, whoever has mishap responsibility normally conducts the safety review and approves the test plan. In this manual, the term "aerospace vehicle" includes, but is not limited to: manned vehicles, balloons, UAVs, RPVs, R/Cs, and atmospheric rockets.

- Flight tests and associated ground tests involving AFRL assigned aerospace vehicles or aerospace vehicles for which AFRL has mishap accountability or liability: AFRL is responsible for conducting the technical and safety reviews and obtaining test plan approval per this manual. The AFRL PM is responsible for notifying the AFRL Flight T&E office for assistance in establishing and conducting the safety review. The PM's directorate chief scientist or his designated representative conducts the technical review.
- Flight tests and associated ground tests involving other government or NASA aerospace vehicles: To eliminate duplication of effort, technical and safety reviews conducted by other organizations partnered with AFRL, possessing mature, well defined and documented review procedures may be accepted at the discretion of the appropriate AFRL TAA, Detachment Chief of Safety, and HQ AFRL Chief of Safety. AFRL approval of the test plan is also required. If the organization owning the aerospace vehicle with mishap

accountability and liability decides not to conduct the safety review, then AFRL must conduct one. The AFRL PM will include in the written agreement (MOA/contract) with the other involved organizations a statement that specifies which organization will conduct these reviews.

- Flight tests and associated ground tests that are either wholly or partly contractor conducted under an AFRL contract: AFRL will conduct a safety review board (SRB) and technical review board (TRB) to approve the contractor's test plan prior to first test since AFRL has mishap accountability through the AFRL contract. The PM must ensure that the requirements for the contractor to provide an acceptable test plan and to support the government SRB and TRB are included in the contract

In order to standardize AFRL flight test plans, use the tailored test plan DI-NDTI-80566A/T, discussed in **Para** 5.7 and shown in **Attachment A5.4.**

Refer to **Sections 3.2** (test planning processes), **3.3.6** (liability), **3.3.9** (mishap accountability), **4.6** (safety of flight certification), and **7.3** (use of UAVs) in this manual for additional information. Reference **Attachments A9.1** for the Test Program Checklist and **A9.2** for the Flight Test Program T&E Tasks Schedule checklist

Governing Documents: AFI 91-202/AFMCS1, *The U.S. Air Force Mishap Prevention Program.*

5.2. Technical Review

DEFINITIONS:

Technical Review Process: The formal review and documentation to ensure a thorough assessment of the test plan for technical soundness and adequacy. The technical review will verify the overall method of test is adequate to evaluate the requirements and verify that objectives can be met with acceptable technical risk.

TRB: An independent group of knowledgeable individuals convened to ensure a thorough assessment of the test plan for technical soundness and adequacy.

DISCUSSION: The technical review is conducted to provide a formal technical review of the test plan. All flight test plans will have a final technical review. The TRB will be scheduled to occur before the safety review.

The AFRL PM is responsible for ensuring a TRB is conducted for their test plans.

The following discussions are for AFRL conducted technical reviews.

The PM's TD chief scientist is the chairman for AFRL conducted technical reviews; however, the chief scientist may delegate this position. If the chief scientist delegates the position of TRB chairman, the delegated chairman will report back to the chief scientist the TRB results and technical risk level. The TRB chairman will decide if a formal TRB is required. If a formal TRB is not required, the TRB chairman reviews the test plan, addressing all the items listed

below. If a formal TRB is required, the TRB chairman establishes and conducts the board. In either case, the chairman will report the results to the SRB chairman and the chief scientist, if the position was delegated.

When the program involves a T-2 modification, the TRB is an integral part of the CCB process. The results of the TRB are briefed to the CCB.

The TRB assesses the soundness of system designs and test plans to reduce technical risk. As a minimum, technical reviews will assess test requirements, techniques, approaches, and objectives. The TRB will also ensure that environmental assessments have been completed and referenced in the test plan. The TRB will assign a technical risk to the program. Items to consider at the review include, but are not limited to:

- Program objectives.
- Test objectives.
- Measures of performance.
- System design and integration.
- Instrumentation system.
- Encryption of data.
- Data requirements, data handling, data classification, and analyses plans.
- Review of environmental assessments.
- Identification of potentially high risk tests and their relationship to sequence of testing.
- Known development problems.
- Status of preparation and planning.
- Executability of the plan.
- Technical review of the test matrix and test procedures.
- Adequacy of the test effort.
- Technical go/no-go criteria.
- Alternative courses of action.
- Resources needed and available.
- Assessment and reduction of technical risk.
- Other items important to test planning.
- Success criteria.

To allow participants sufficient time to review the documentation, the PM should distribute the documents to TRB members (and IMR members for major T-2 modifications) at least one week prior to the TRB. The review is conducted according to a prepared agenda. A sample TRB agenda is in **Attachment A3.4**. After the TRB is completed, the chairman ensures that the appropriate participants sign AFRL Form 19B, *Technical Review Board,* for the TRB. The TRB chairman appoints someone to record and publish the minutes. Minutes of the meeting are recorded for the program records and contain the items of discussion, an overall technical assessment in regards to readiness to start testing, and a technical risk level. Attachments to the minutes include the agenda, attendance list, AFRL Form 19B, a copy of the test plan, letters and documents from other organizations that provide inputs for the board, and the TRB chairman appointment letter. The minutes are signed by the TRB chairman and the PM. The TRB

chairman will report the results to the SRB chairman and to the directorate chief scientist. If a T-2 modification is included in the program, the TRB chairman will report the results to the CCB chairman also. A TRB checklist is presented in **Attachment A9.3**.

The AFFTCI 99-1, *Test Plans,* contains a list of suggested questions to address at a TRB.

Governing Documents: AFI 91-202/AFMCS1, AFI 99-103, AFMCI 99-103, AFFTCI 99-1

5.3. Safety Review.

DEFINITIONS:

Safety Review Process: The formal review and documentation of test safety planning of a flight test and associated ground test by the independent safety reviewing authority. The outcome of the safety review is an approved test plan and assessment of the overall test risk. The process consists of two parts - the safety review and the test approval.

SRB: An independent group of knowledgeable individuals convened to review the test plan, ensure test hazards are identified, eliminated, or minimized, and recommend the overall risk level to the TAA.

Risk: Risk is the probability and severity of loss from exposure to a hazard.

DISCUSSION: The safety review process ensures a thorough assessment of the adequacy of test safety planning. The process evaluates the extent to which the test plan addresses the severity and the probability of occurrence of known hazards and ensures they are minimized. It also assesses the residual risk. This process applies to all AF organizations that plan, support and conduct ground, weapons, or flight test and evaluation including R&D laboratories. It applies to tests conducted by AFRL. All test plans will have a final safety review. The safety review will be scheduled to occur after the technical review. Tests will be conducted according to the approved test plan. Changes to the test plan will require further safety reviews.

The AFRL PM is responsible for ensuring a SRB is conducted for test plans. Reference **Para** 5.1 to determine who is responsible for conducting the SRB.

The following discussions are for AFRL conducted SRBs. Refer to **Section 6.4** for the additional SRB tasks required by the 412 TW.

To ensure enough time is allotted in the test schedule to conduct and approve the test plan and the accompanying test requirements, the following is a discussion of the SRB scheduling.

- Provide a draft test plan to the AFRL Flight T&E office at least 8 weeks prior to the first test event (e.g. taxi, first flight, or ground test).
- The AFRL SRB will be held a minimum of 4 weeks prior to the first test event.
- The final test plan will be submitted to the AFRL Flight T&E office at least 3 weeks prior to the first test event. The AFRL Flight T&E office will submit the package to either

the 46 OG for review within the AAC, or to the 445 Flight Test Squadron (445 FLTS) to staff the appropriate level coordination or approval within AFFTC. More time may be needed for review and coordination if the program is assessed by the AFRL SRB as MEDIUM or HIGH risk.

- This schedule will allow enough time for the AFRL SRB and test plan approval to occur and the additional time needed for AAC or AFFTC to review and coordinate or approve the test plan prior to first test event.

SRB chairman and board members for AFRL conducted SRBs:

- The AFRL Detachment Chief of Safety will either act as the SRB chairman or designate one in writing. The SRB chairman will select board members.

When a test is ready for a safety review, the SRB chairman determines if a formal SRB is required based on the scope, complexity, similarity to previous tests, and anticipated risk level.

- If no formal SRB is required, the SRB chairman reviews the test safety plan to ensure all hazards have been identified and controls have been developed. The chairman establishes a risk level for each individual hazard and test event (e.g. sortie, specific test, test milestone), proposes the overall risk level of the test and recommends to the TAA a risk level and whether or not to execute the test via the AFRL Form 19A, *Safety Review Board.*
- If a formal SRB is required, the chairman convenes an SRB to ensure all hazards are identified and controls developed, certify the completeness of the safety plan, establish a risk level for each individual hazard and test event (e.g. sortie, specific test, test milestone), and propose the overall risk level of the test. The chairman recommends to the TAA an overall test risk level and whether or not to execute the test based on the SRB results. A sample letter to establish a SRB is given in **Attachment A4.4.**

After completion of the AFRL SRB, the AFRL Flight T&E office will send the SRB package to the 445 FLTS to staff the appropriate level of coordination or approval within AFFTC for programs that fall under 412 OG flight authority. The coordination or approval must be obtained prior to first taxi and flight test.

The following paragraphs discuss the structure, conduct, and objectives of the SRB.

Members to the board are chosen as required from:

- AFRL/SEF for medium and high risk tests; may also be invited to low risk tests.
- AFRL Detachment System Safety.
- Base Safety for programs conducted on a military base (if they choose not to attend the SRB, the PM will notify them of the SRB results and projected test schedule).
- Base Operations for programs conducted on a military base.
- Engineering.
- Operations TPS graduate or operational person with test experience).
- Maintenance.

- Project personnel as appropriate (e.g. GFR, RTO personnel, test pilot).
- Other disciplines tailored to the individual program.
- For programs that include a major aerospace vehicle modification, the IMR team is invited to the SRB.

To allow the participants sufficient time to review the documentation, the PM should distribute the documents to board members at least one week prior to the SRB. The review is conducted according to a prepared agenda (see **Attachment A3.5** for a sample agenda and risk assessment matrix). At the SRB, the chairman distributes and explains AFRL Form 12, *Test Hazard Analysis.* The PM discusses the AFRL Form 29, *AFRL Test Safety Mishap Worksheet*, and ensures that the PM and the detachment safety persons are cognizant of their responsibilities in case of a mishap. The SRB chairman appoints someone to record and publish the minutes. Minutes of the meeting are recorded for the program records and contain mishap information (include statement of what organization has mishap accountability), highlighted items, SRB recommendations, action items, new test hazards, remaining approval items, and the overall test safety risk level recommended by the board. Attachments to the minutes include:

- SRB approval document (AFRL Form 19A).
- Mishap reporting (AFRL Form 29).
- List of attendees.
- SRB members.
- Test hazard analyses (THAs) (AFRL Form 12) with risk assessment matrix.
- Test plan.
- Letters and documents from other organizations which provide inputs for the board.
- Other applicable documentation.
- TRB package.
- SRB chairman appointment letter.

The minutes are signed by the SRB chairman, PM, and SRB recorder and presented to the TAA. The TAA signs the AFRL Form 19A to approve the test plan. The TAA signature also denotes SRB review and TAA acceptance of the aircrew or UAV operator qualification, experience, and currency.

During the SRB presentations, any test safety concerns not previously identified will be documented on new THA forms. After the presentations are completed, the SRB chairman oversees a general discussion of each THA. The chairman ensures that the appropriate SRB participants sign the AFRL Form 19A. An SRB checklist is presented in **Attachment 9.4**.

Taxi and flight testing are not authorized until after the AFRL Flight T&E office verifies in writing that all TAA signoffs and 412 OG reviews and approvals are complete, and the planned flight activity has been entered into the AFRL flight schedule.
If an approved test plan requires an amendment, use either the long or short amendment process in AFFTCI 91-5, *AFFTC Test Safety Review Process*, **Chapter 7**, to request amendment approval from both AFRL and the 412 TW.

The following is a discussion of risk levels and TAA.

- If identifiable hazards are to be accepted during the test project, a brief justification for accepting the risk, instead of minimizing it, must be provided to the board.
- The TAA assumes the risk associated with test conduct and is responsible for weighing the benefits of a given test against the risk.
- The SRB will use the risk level definitions and assessment shown below (also found in AFFTCI 91-5, **Attachment 8**) as a guide in determining the safety risk of the individual event and over all test safety risk levels. **Attachment A3.5** in this manual also contains the risk assessment chart.

  - Low risk: Test or activities that present no greater risk than normal operations after minimizing procedures and corrective actions have been applied.
  - Medium risk: Test or activities that present a greater risk to personnel, equipment, or property than normal operations even after minimizing procedures and corrective actions have been applied.
  - High risk: Tests or activities that present a significant risk to personnel, equipment, or property, even after all precautionary measures have been taken.
  - **Note**: During the safety review, personnel will use these guidelines, expert opinions, engineering analysis, and common sense to assign risk levels to each hazard, individual test event, and the test as a whole.

- The following lists the AFRL TAA for each safety risk level. Refer to **Section 6.4** for discussion of 412 TW approval levels.

  - Low risk: AFRL TD division chief, or as delegated, of the PM.
  - Medium risk: AFRL TD director, or as delegated, of the PM.
  - High risk: AFRL/CC.
  - All High risk tests require a test approval briefing.
  - High risk test approval packages and briefings will be coordinated through the HQ AFRL Chief of Safety.
  - Test approval briefings for medium and low risk test plans will be accomplished at the discretion of the TAA.

SRB assessed risk level	AFRL TAA	AFFTC TAA
High Risk	AFRL/CC	AFFTC/CC
Medium Risk	TD Director or delegate (Deputy / Associate Director)	412 TW/CC
Low Risk	TD Division Chief or Delegate (Deputy Division Chief)	Coordinate through 412 OG/CC

- An AFRL SRB chairman will be assigned to AFRL tests conducted at a MRTFB or a NASA test center. The chairman will participate (or delegate a SRB member to participate) in the MRTFB/NASA review. The AFRL SRB chairman will determine if all the AFRL topics of interest are addressed at the MRTFB/NASA review. If not, the AFRL SRB chairman may request the topics to be added to the MRTFB/NASA review or conduct an independent AFRL SRB. The AFRL SRB chairman will present the results of the

MRTFB/NASA review or the AFRL SRB, if conducted, to the appropriate AFRL TAA for approval. This approval is required prior to first taxi and flight test.

Special considerations for flight test programs:

- Mishap accountability must be clearly established prior to conducting tests and documented in the SRB minutes.
- Contractor test programs using AFRL resources (funding, furnished equipment, or personnel) shall comply with the AFRL test safety process, i.e. AFRL will conduct the TRB and SRB process for contractor test plan approval.
- The TAA may accept tests planned and reviewed by other organizations. This acceptance is based in part on the participation of AFMC personnel in that review process.
- Flight tests of aircraft and aircraft related systems, aircraft weapons, and munitions categorized as medium or high risk and conducted by an organization other than an AFMC test center require either independent review by an AFMC test center or SRB participation by a TPS graduate.
- Piloting of manned medium and high-risk events by other than graduates of a TPS will be specifically documented in the test plan and SRB minutes for consideration by the TAA.
- When the program involves a T-2 modification to an aerospace vehicle, the SRB is an integral part of the CCB process. This review normally takes place after the PCI and PMA have been completed. The results of the SRB are briefed to the CCB.
- When the program involves a modification to an FAA certified vehicle, the contractor or PM will determine if the entire modification is FAA certified. If there are parts of the modification that are not included in the FAA certification, the PM will identify them to the SRB chairman as early in the program as possible. The SRB chairman will include review and approval as required of these items in the SRB (see **Para** 7.1).
- RF Dependent Systems: T&E of any RF dependent device, to include COTS and Non-Destructive Inspection (NDI), shall be conducted in accordance with DoDD 4650.1. Specifically, tests will be conducted only when appropriate equipment allocation (spectrum certification) guidance as prescribed under AFI 33-118 is in place.

Governing Documents: AFMCPAM 63-101, AFI 90-901, AFI 99-103, AFI 91-202/AFMCS1, AFMCI 21-126, AFMCI 99-103, AFFTCI 99-1, AFFTCI 99-103, *AFRL Program Oversight.*

5.4. Hazardous Tests.

DEFINITIONS: Hazardous tests are those that, after every reasonable effort has been made to minimize hazards, still have factors, mission elements, or test points that could create a significant adverse public reaction in the event of a mishap, could individually or in combination increase the chance of producing a mishap, or could result in a significant impact on a program.

Hazard: Condition, procedure, or practice that creates a potential for producing death, injury, illness, or equipment or property damage.

DISCUSSION: The above is a general definition of a hazardous test. Basically, it includes those tests in which there is a greater than normal risk to personnel, equipment, or property even after

all reasonable precautions have been taken. Hazardous tests or events are identified at the SRB when a risk level is assigned to the individual events and the overall test.

The following are examples of activities that may be considered inherently hazardous:

- Flight operations near or beyond the extremities of the currently approved flight envelope (envelope expansion).
- Tests involving high-energy lasers, significant quantities of high explosives, directed energy, or other dangerous media as defined in AFJI 11-204 *Operational Procedures for Aircraft Carrying Hazardous Materials.*
- Tests in which departure from controlled flight is likely.
- Initial flights after completion of T-2 modifications performed according to AFMCI 21-126 in which changes in structural integrity, aerodynamic stability, or other safety of flight characteristics may occur.
- Tests of experimental or research aircraft.
- Tests to check compliance with specifications (spin tests, handling qualities, etc.).
- Low altitude terrain following sorties at night or in instrument meteorological conditions.
- Tests of separation of internally carried stores.
- Tests requiring a Flight Termination System (FTS).

5.5. THA.

DEFINITION: The THA formally documents each hazard associated with a test and the actions to be taken to control each hazard to an acceptable level of risk.

DISCUSSION: The THAs are generated by the test plan author prior to the program's SRB and by the SRB members at the SRB using AFRL Form 12. They are of two types:

- General: These THAs apply to tests in general, for example, flying tests in non-restricted airspace or bird strikes.
- Test specific: THAs that apply only to the specific test being reviewed.

Prepare THAs for the test specific hazards. General hazards should be addressed in the test plan, but do not necessarily require a separate THA written for them. This is at the discretion of the SRB chairman.

The following discussion will assist in completing the THA form:

- Define the hazard, cause and effect:

  - Hazard: Condition or situation that has the potential to result in a mishap or accident
  - Cause: Circumstance or action that leads to the hazard’s occurrence. This is the cause of the hazard, not the mishap (effect). This could be more than one item. Number them for reference in the minimizing procedures.

- Effect: The mishap or accident to be avoided.

- Use the risk assessment matrix, shown in **Attachment A3.5**.
- Controls and Minimizing procedures: Explain the actions taken to prevent the hazard from occurring. In general, these are the limitations you are placing on your project. Each minimizing procedure should reference, by number, the specific cause you are trying to control.
- Corrective actions and Emergency Procedures: These are steps to be taken if the hazard should occur. These are used to recover from a hazardous situation, or to limit the extent of the injury or damage due to a hazard that is occurring.
- Comments: Additional considerations may be recorded here.

For sample THAs, contact the AFRL T&E office.

Governing Documents: MIL-STD-882D, AFI 91-202/AFMCS1, AFFTCI 91-5.

5.6. Mishap Reporting.

DEFINITION:

Mishap reporting: The process for AFRL PMs to follow in case of a mishap.

Mishap: Mishaps are unplanned events resulting in loss or damage to DoD or private property, injury, departure from range boundaries or public endangerment. Exceptions to mishap reporting apply only if destruction or damage to a test asset was documented in the test plan as a desired outcome of the test, it has occurred at the planned time and for anticipated reasons, and the test objectives were met.

DISCUSSION: In case a mishap occurs during an AFRL flight test program, the PM and directorate safety office must know what to do, who to contact, and how to initiate mishap reporting. The following discussion details the process.

- Prior to the SRB, the PM fills in the names and phone numbers in the Mishap Notification Record portion of AFRL Form 29. The detachment safety line will list a primary and a secondary representative and AFRL/SEF for contact. Include a cell phone number for the safety personnel for 24/7 reporting. The document then becomes For Official Use Only (FOUO).
- The SRB chairman will ensure that the directorate safety representative is aware of their responsibilities for executing mishap reporting for the test.
- In case of a mishap, the PM or a designated representative will ensure that mishap response actions are executed IAW with the test plan and this document. As soon as initial mishap response is complete, the PM or designated representative will initiate the mishap reporting process by completing AFRL Form 29. The PM or designated representative will then notify the detachment safety representative and AFRL/SEF listed on the Form 29 immediately or as soon as possible within 8 hours. The detachment safety representative will gather the mishap information and in turn notify the AFRL HQ Safety Office. The PM

or designated representative will then continue notification of all personnel listed on the Form 29.

- If more than one government organization is involved with the test, the PM and SRB directorate safety member will determine with the other organizations who will execute the mishap reporting. This agreement will be done prior to the SRB, will be discussed at the SRB, and will be documented in the SRB minutes. If a mishap occurs, the AFRL PM will complete the AFRL Form 29 and notify the people listed; the AFRL directorate safety representative will then execute the previously agreed to mishap reporting process.
- The 412 OG is the grounding authority for AFRL Class A or Class B mishaps (reference **Para** 6.6). For all other classes of mishaps, any grounding decision is made by the AFRL SRB chairman after concurring with the AFRL TAA and AFRL/SEF. The AFRL SRB chairman gathers comments from his board and recommends return-to-fly to the AFRL TAA. The AFRL TAA approves the return-to-fly order. 412 OG will be provided a copy of the TAA issued clearance to resume flights.

A list of reportable mishaps, such as dropped objects, is found in AFI 10-206, *Operational Reporting*, and AFMAN 91-223, *Aviation Safety Investigations and Reports*.

As a reminder, in case a mishap occurs, the test team should follow the initial responses listed below:

- Ensure everyone is safe and contact emergency services, if needed.
- Minimize fire damage to wreckage, if applicable.
- Do not disturb the accident scene-preserve any or all wreckage and surrounding areas in their original state.
- Only move or change things at the scene in the interest of safety. Photograph the site before and after anything is disturbed. Take lots of pictures so an investigator can easily retrace the situation before it was changed.
- Gather pertinent personal information from everyone at the scene (name, duty title, office symbol, contact information).

- Gather witness statements as soon as possible to ensure clarity and freshness of memory. "Write down exactly what you personally witnessed."
- Follow the contact procedures on the AFRL Form 29. Report mishap to detachment safety office as soon a possible but no later than 8 hours after occurrence.
- Wait for guidance from range safety, a trained safety investigator, or HQ safety personnel before removing, cleaning, or disturbing a crash site.

If in doubt, wait and ask someone. Remember that all safety investigations are non-retributional in nature and are conducted for mishap prevention purposes only.

The important concept here is to ensure that the entire test team and the detachment safety representative understand prior to the start of the test what actions each person is responsible for and how to do them and that AFRL HQ Flight Safety must be notified of all mishaps.

Aircraft mishap investigative responsibilities will be conducted IAW AFI 91-204.

Governing Document: AFI 10-223, AFI 91-204, AFMAN 91-223.

5.7. Use of Tailored Test Plan DID.

DEFINITION: The tailored DID DI-NDTI-80566A/T ensures that test plans received under a contract contain the appropriate information to allow safety and technical review.

DISCUSSION: All AFRL contracts that include flight tests conducted by either the contractor or the government and that the PM desires the contractor to provide the flight test plan including any associated ground testing shall state that the contract shall require the contractor to submit a test plan to the government for review and approval prior to first test. The contract must also state that the contractor shall support the test plan reviews.

To ensure that the test plan submitted contains the appropriate information, use the AFRL test plan format in conjunction with the test plan DID DI-NDTI-80566A/T. These documents are available from the AFRL data manager (DM) in Detachment I, AFRL Wright Site Corporate Services (DET 1, AFRL/WSC), DSN 785-7466. **Attachment A5.5** contains the test plan format. The accompanying Notes to the Buyer are in **Attachment A6.2**.

5.8. Test Readiness Review (TRR).

DEFINITION: The readiness review process is conducted before the commencement of testing for new-starts and system upgrades, test milestones (e.g. first flights, etc), or after an extended break in test activity.

DISCUSSION: The TRR will ensure all preparations for initiating a test have been completed and known anomalies have not compromised the execution of the test. All reasonable efforts to minimize risk must be made and verified to the test approval authority.

Governing Document: AFMCI 99-103.

Chapter 6

AFRL FLIGHT OPERATIONS

6.1. General.

DEFINITION: The 412 OG is the flight authority for AFRL. For AFRL programs flown on Eglin or Holloman ranges, or where the designated RTO is a 46 TW subordinate unit, the 412 OG may delegate flight authority responsibilities to the 46 OG or 46 TG, as appropriate.

DISCUSSION: In July 2006 the 412 OG, 412 TW, AFFTC at Edwards Air Force Base assumed operational control of all AFRL test planning and flight execution. AFRL/CC, AFFTC Commander (AFFTC/CC), and HQ AFMC/A3 signed a MOA between AFRL and AFFTC to establish the framework for this reorganization. Under the MOA, AFRL has overall responsibility for program management and administrative support for its research programs. The AFFTC has responsibility for the safe and effective conduct of flight operations for AFRL research programs requiring flight activities. This MOA applies to all AFRL military, civilian, and government contractor flight operations regardless of program size or location of actual flight operations. AFRL will continue to use the test processes established in AFRLMAN 99-103 unless the 46 OG or 46 TG require other processes to accomplish their delegated oversight responsibilities..

The 412 OG responsibilities are:

- As flight authority for AFRL, provide review and approval of all flight activity.
- Provide flight authorization for all AFRL flyers.
- Review or approve all AFRL SRB packages.
- Review qualifications and currencies of aircrew and UAV operators.
- Provide mishap reporting and accountability assistance.

The AFRL responsibilities are:

- Provide the 412 OG with monthly summaries of all program flight activity.
- Provide daily flight schedules to the 412 OG.
- Identify total system cost.
- Obtain test card approval from AFRL management and AFFTC.
- Determine the need for a GFR.

These tasks often require the PM to provide information to the AFRL Flight T&E office:

AFRL/VACD
Building 45, Room 134, WPAFB OH 45433
DSN 785-4404
E-mail address: afrldl-flighttestandevaluation@wpafb.af.mil
Global address: AFRL DL-Flight Test and Evaluation

All these topics are discussed in detail in this chapter.

Reference **Attachment A9.1** for the Test Program Checklist and **Attachment A9.2** for the Flight Test Program T&E Tasks Schedule Checklist

Governing Document: AFFTCI 99-103

6.2. Flight Authority Review and Approval.

DEFINITION: The AFFTC will provide flight review and approval authority for all AFRL flight activities.

DISCUSSION: The AFFTC will be responsible to ensure AFRL test plans are conducted in accordance with applicable FAA regulations or AF 10, *Operations* and AF 11, *Flying Operations* series instructions and their AFMC and AFFTC supplements. This responsibility may be delegated to a GFR if the AFRL flight activity is conducted under a contract that requires GFR participation. The GFR function is further discussed in **Para** 6.11. Further guidance can be found in the AFMC and AFFTC supplements to AFI 11-401, *Aviation Management*.

6.3. Flight Authorization for AFRL Military, Civilian, and Contractor Flyers.

DEFINITION: Flight authorization is specific authorization to fly in USAF and non-USAF aircraft (including contractor aircraft) in performance of official flight test duties. AFRL personnel required to perform in-flight duties are classified by HQ AFMC/A3 as Maintenance/Engineering Support Personnel (MESP). MESPs do not log flying time and are not entitled to flying incentive pay. Flight authorization is not required for AFRL travelers on normal TDY flights.

DISCUSSION: A person may not perform duties aboard military, government, or civilian aircraft unless specifically authorized and physically and physiologically qualified to fly. Military MESPs will be approved by the 412 OG/CC via AFFTC Form 5416, *AFFTC Flight Request/Approval*. Government civilian MESPs will be approved by the 412 OG and contractor MESPs will be approved by the AFFTC/PKMO (GFR) via AFMC Form 81, *Flight Authorization for Maintenance Engineering Support Personnel (MESP).* The following paragraphs describe how to obtain flight authorization for AFRL MESP flyers. The one exception to this requirement is if the flyer is flying on AF assets at an AF flight test center such as Eglin. If the test center provides the flight authorization, then the flyer does not need to get authorization from the 412 OG also. Provide a copy of the test center flight authorization to the AFRL Flight T&E office for information only.

The MESP position permits the AFRL flyer to fly up to 12 missions during any consecutive 12 month period. If the AFRL flyer (military, civilian, or contractor) projects more than 12 flights in a consecutive 12-month period, the AFRL flyer must obtain a waiver per **Para** 6.3.3 below in addition to the flight authorization.

Submit the completed flight authorization request packages, waiver requests, and familiarization flight requests to the AFRL Flight T&E office at least 30 days prior to your requested flight date. The AFRL Flight T&E office will review and sign the forms as the requester, then submit them to the 412 OG for approval. The flight authorization is valid for one year from the 412th signing date. However, the flight physical and physiological training must also be valid in that year or the flyer must renew it. Reference the flight authorization checklist in **Attachment A9.7**.

Governing Document: AFI 11-401/AFFTC Sup1, *Aviation Management*.

6.3.1. AFRL Civilians and On-Site Contractors: To obtain MESP authorization for AFRL civilians and on-site contractors, the AFRL flyer will prepare an AFMC Form 81: http://www.e-publishing.af.mil/search.asp?keyword=AFMC+81. AFRL civilians include the following documents with the AFMC Form 81: AF Form 1042, *Medical Recommendations for Flying or Special Operational Duty*, http://www.e-publishing.af.mil/search.asp?keyword=AF+1042, (reference **Section 6.3.5** for additional information); and AF Form 702, *Individual Physiological Training Record (DD Form 2005, Privacy Act Statement serves)*, http://www.e-publishing.af.mil/search.asp?keyword=AF+702 (when required). AFRL on-site contractors include the following documents with the AFMC Form 81: On-site AFRL contractors will submit an FAA class III medical instead of an AF Form 1042. The only exception is if flight doctor support is written into the contract, then they could get an AF Form 1042. AFRL on site contractors also submit an AF Form 702 when required.

Additional information for AFRL civilians:

- Attach a signed copy of their statement of duties and experience (SDE) to the AFMC Form 81 that contains a statement to the effect that occasional flying may be required in performance of duties.
- The flyer's branch chief signs the AFMC Form 81 in the requester block.

Additional information for AFRL contractors:

- Each time an AFFTC Form 5416 or AFMC Form 81 is submitted to approve contractor personnel, the Contractor's Requesting Official (CRO) will submit to the Edwards AFB GFR a letter certifying: the name & contact information for both the GFR and ACO administering the contract, the person's applicable education/experience & qualifications, that the performance of in-flight MESP duties by the person is essential and is required to fulfill official job responsibilities and is specifically required and authorized by the terms of the contract (contract number will be listed), and that the person has been briefed that: (1) Their status aboard the aircraft is that of a MESP rather than a passenger. (2) The aircraft missions on which they participates as a MESP may involve flight testing or flight of a special high risk nature from which passengers would normally be excluded. (3) Their personal insurance policies may be jeopardized by their presence aboard in a MESP status without special aviation riders. A check with their insurance representative is recommended.

- In addition to the letter from the CRO listed in item 15 above, the CRO will submit the following to the Edwards AFB GFR each time an AFFTC Form 5416 or AFMC Form 81 is submitted to approve contractor personnel: (1) FAA medical certificate or AF Form 1042, (2) AF Form 702 (if required), and (3) for personnel flying as the pilot: FAA pilot certificate, DD Form 1821, and DD Form 2628 approved by the GFR administering the contract. Note that the AFRL T&E office will submit the flight authorization request package containing these forms provided by the AFRL flyer to AFFTC.
- The AFRL CO signs the AFMC Form 81 in the requester block.
- The Edwards AFB GFR (AFFTC/PKMO) will coordinate on AFFTC Forms 5416 and AFMC Forms 81 for approval of all contractor flight personnel prior to 412 OG/CC approval.

The MESP orders are aircraft specific. Therefore, the "type aircraft" block must list all the aircraft types on which the member plans to fly. Include in the justification section the name(s) of the flying program/mission(s) with a brief program description, the proposed flight dates, and who owns the aircraft. If the aircraft is not an AF aircraft, review AFI 11-401/AFMCSUP1, *Aviation Management*, **Para** 1.11.1.6, and state in the requester block that these items are met.

6.3.2. AFRL Military Personnel.

To obtain AFRL military MESP non-interference flight authorization, prepare the AFFTC Form 5416, https://bsx.edwards.af.mil/pim/FTCeFORMS/afftceforms.htm. Include the following documents with the form: AF Form 1042 (reference **Section 6.3.5** for additional information), http://www.e-publishing.af.mil/search.asp?keyword=AF+1042 and AF Form 702, http://www.e-publishing.af.mil/search.asp?keyword=af702&go.x=11&go.y=8 (when required).

Reference **Attachment 10** in this manual for instructions on preparing the AFFTC Form 5416.

6.3.3. MESP Waiver:

If an AFRL MESP flyer (military, civilian, or contractor) is required to fly more than 12 flights in a 12 consecutive month period, the flyer must obtain a waiver from the 412 OG/CC. To obtain the waiver, prepare the AFFTC Form 5416, https://bsx.edwards.af.mil/pim/FTCeFORMS/afftceforms.htm. Include the following documents with the form: AF Form 1042, http://www.e-publishing.af.mil/search.asp?keyword=AF+1042, AF Form 702, http://www.e-publishing.af.mil/search.asp?keyword=AF702 (when required), and AFFTC Form 5499, https://bsx.edwards.af.mil/pim/FTCeFORMS/afftceforms.htm, signed by the GFR (when required). The 412 OG/CC is the waiver authority for the 12 sortie limit. Reference **Attachment 10** for instructions on preparing the AFFTC Form 5416.

MESPs approved to fly more than 12 sorties in a consecutive 12 month period will accomplish a closed book written exam administered by the flying unit standardization and

evaluation section, and emergency training including a review of the aircraft emergency equipment and procedures IAW AFI 11-301V1 AFMCSUP1 (I), *Aircrew Life Support (ALS) Program*.

6.3.4. Familiarization Flights:

DEFINITION: Flight to familiarize individuals who normally have aviation related responsibilities with USAF aircraft and missions.

DISCUSSION: The purpose of the familiarization flight program is to reward, motivate, or increase an individual's understanding of the AF mission.

To obtain permission to participate in a familiarization flight, complete the AFFTC Form 5416, *AFFTC Flight Request / Approval*, https://bsx.edwards.af.mil/pim/FTCeFORMS/afftceforms.htm. Reference **Attachment 10** for instructions on completing this form. The flyer is also required to obtain clearance by a flight surgeon, but not a full physical, documented on the AF Form 1042.

The familiarization processes discussed below apply to all AFRL active duty and reserve component military (all grades), DoD civilian equivalents (all grades), and civilian employees of DoD contractors. For contractors, the requirement for a familiarization flight will normally be specified in their contract.
Familiarization flights on an AF aircraft:

- The approval authority is the 412TW/CC.
- Send the AFFTC Form 5416 and the AF Form 1042 to the AFRL Flight T&E office at least 30 days before the desired flight date. In addition, contractors must submit an AFFTC Form 5499, https://bsx.edwards.af.mil/pim/FTCeFORMS/afftceforms.htm, signed by a GFR in their package. The AFRL Flight T&E office will review and coordinate on the package and send it to the 412 TW for processing and approval.

Familiarization flights on non-AF aircraft, including contractor aircraft:

- The approval authority is AFRL/CC or AFRL Vice Commander (AFRL/CV), if delegated.
- A safety review must be conducted prior to the flight that examines:

  - Performance envelope of the aircraft.
  - FAA airworthiness certification of civilian aircraft.
  - Orientation and evaluation flight profile.
  - Qualification of the participating AFMC personnel.
  - Qualification of the participating non-AFMC personnel, including the aircrew.
  - Contact the AFRL Flight T&E office to determine who will conduct the safety review.

- Send the AFFTC Form 5416 and AF Form 1042 through normal directorate channels to AFRL/CC or AFRL/CV for approval (AFFTC Form 5416, blocks 22 and 23) at least 30 days prior to the flight date. Include the AFRL Aerospace Vehicles Technology Assessment and Simulation Branch (AFRL/VACD) in the coordination; this office will sign the AFFTC Form 5416 in the requester block (blocks 18 and 19) prior to going to AFRL/CC or AFRL/CV.

Governing Document: AFI 11-401/AFMCSUP1, AFI 11-401/AFFTC Sup 1.

Checklists describing the flight authorization process can be found in **Attachment A9.7**.

6.3.5. Additional Information:

- The AFRL Flight T&E office will return the approved flight authorization package to the AFRL flyer. The flyer's 4-letter branch chief or equivalent supervisor keeps the approved AFMC Form 81 or AFFTC Form 5416 in the flyer's personnel record. Before each flight, the flyer will notify the branch chief of the flight and obtain the branch chief's written release to fly. The branch chief will base this release on a review of the flyer's record to ensure all required training, egress, physical, and any other requirements are current and that the flight is directly related to the flyer's official duties.
- The 4-letter branch chief will track and document individual's flight activity and, at the end of each calendar year, report the activity to the AFRL Flight T&E office. The branch chief's report will include names of flyers, types of aircraft, dates and length of sorties, and purpose of flights. The AFRL Flight T&E office will prepare the annual AFRL flying report IAW AFI 11-401/AFMC Sup 1 for HQ AFMC/A3 each January.
- In addition to the authorization to be on flight status from the 412 OG, AFRL flyers need flight authorization from the owner of the aircraft to fly on their vehicle. The organization owning the vehicle will provide this permission. Regardless of who provides the day-to-day flight authorizations, contractor personnel under GFR oversight must be listed on a GFR approved Request for Flight Approval form valid for the date and aircraft type & serial number for the flight. The AFFTC Form 5499, *Contractor Request for Flight Approval*, (or DCMA Form 644, *Request for Flight Approval*) will be used to document the GFR's approval for contractor personnel to fly for a period not to exceed one month (as determined by the administering GFR). The Contractor's Requesting Official (CRO) will submit to the administering GFR (typically the local GFR) the AFFTC Form 5499 (or DCMA Form 644) for GFR approval at least two business days prior to the valid period listed on the request; the CRO will list on the Form 5499 (or 644) all flight currencies and ground prerequisites (medical, etc.) that have expired or will expire during the valid period of the request.
- The AFRL civilian flyer's position description (PD) or SDE must contain a statement to the effect that the position requires the incumbent to perform duties on military and civilian aircraft as a normal part of the position. For contractors not covered by AFI 10-220(I), the requirement to fly must be stated in their respective

contracts. The contractors must be qualified employees or prospective employees of a government contractor according to the terms and conditions of a current government contract.

- HQ AFMC/SE has suggested the following job safety analysis (JSA) write-up for supervisors of AFRL flyers to use: "This person has duties that may entail flying on aircraft as MESP as defined in AFI 11-401/AFMCSUP1. Prior to flight, they are required to receive a safety briefing on applicable hazards and risk mitigation from the pilot or aircraft authority. They will pay particular attention and adhere to applicable emergency procedures, personal and protective equipment use, and other items inherent to safe flight operations."
- The flyer's personal insurance policies may be jeopardized by their presence aboard in a crewmember or operational support status without special aviation riders. Recommend AFRL flyers check with their personal insurance representative.
- Flight Physical and Physiological Training Information:

  ♦ A flight physical is required to fly in performance of duties. AF Form 1042 will be issued as satisfactory evidence of qualification.

  ♦ Personnel at WPAFB may schedule a flight physical at the Occupational Medicine Clinic, building 675, Area B, 904-8432.

  ♦ Military, US government civilian, and civilian contractor personnel who hold a current valid FAA Class 3 or higher, medical certificate may be cleared for MESP duties for the lesser of the valid duration of the FAA certificate or one calendar year. Any condition that is disqualifying for FAA Class 3 may be disqualifying for MESP duties. See bullet below for additional information. Contractor personnel submission of a FAA certificate is satisfactory evidence of qualification when authorized IAW DCMA 8210.1 (details concerning verification of compliance for holding current and valid FAA Class 3 and renewal of clearance to perform MESP duties are subject to provisions of the contract.).

  ♦ As evidence of qualification, military and US Government civilian personnel also must have an AF Form 1042, signed by a military flight surgeon with the annotation "MEDICALLY CLEARED FOR MESP IN-FLIGHT DUTIES" and renewed annually. If an AFRL civilian or military MESP holds a valid FAA class 3 or higher medical certificate, they still must have a flight surgeon prepare an AF Form 1042. AF Form 1042 validation for military members requires flight surgeon review of their medical record, current physical health assessment, and any further evaluation that may be required for MESP duties. US Government civilians without a FAA certificate obtain the AF Form 1042 after a military flight surgeon evaluation to include medical history review, routine exam, and any further medical evaluation that may be required for MESP duties. If the FAA certificate expires in less than one year, the AF Form 1042 is valid only for the duration of the certificate. Applicable medical standards for MESP duties are comparable to AF Flying Class III requirements.

  ♦ MESP who will or may participate in activities requiring routine and prolonged cabin altitudes above 14,000 feet MSL (e.g. HALO missions) must

medically qualify for and complete physiological training IAW AFI 48-123/AFMCSUP1, *Medical Examinations and Standards*, **Para** A8.4.2.2, and AFI 11-403, *Aerospace Physiological Training Program*. MESP duties aboard multi-engine, multi-pilot, non-ejection seat aircraft with normal operating environment similar to passenger aircraft do not require physiological training. Contact HQs AFMC Flight Operations and Standardization/Evaluation Division (HQ AFMC/A3V), DSN 872-7890, for training locations or reference **Attachment 8** in this manual which lists the training locations.

♦ The flight surgeon will annotate on the AF Form 1042: "RESTRICTED TO FLIGHT ALTITUDES LESS THAN 18,000 FEET MSL" for military and US government civilian personnel who will or may participate in ejection seat aircraft flight missions but do not have current physiological training IAW AFI 11-403. Contract civilian personnel, unless in possession of documentation certifying current physiological training, will have the same flight altitude restriction on high performance aircraft missions.

- Specialized training may be required before flight authorization is granted. Training and other flight prerequisites are outlined in AFI 11-401/AFMCSUP1.
- Egress training includes ejection system training (if applicable) and life support training. Check with the aircraft owner to determine who will provide this training.
- When e-mailing or faxing flight authorization documents containing personnel information such as social security numbers, ensure the proper labeling is used.

Governing Documents: AFI 11-401, AFI 11-401/AFMCSUP1, AFI 48-123/AFMCSUP1.

6.4. Coordination and Approval of AFRL SRB Packages:

DEFINITION: AFRL and AFFTC review and approval or coordination are required for all AFRL flight test activities. For test program oversight delegated to the 46 OG, substitute appropriate AAC, 46 TW, and 46 OG references for AFFTC and 412th.
DISCUSSION: In addition to AFRL review and approval of AFRL flight test plans through the AFRL SRB and TRB processes discussed in **Sections 5.2** and **5.3**, the plans require review and coordination or approval through AFFTC organizations before the start of any flight operation.

- Low risk test plans will be approved by the owning AFRL division chief or designee, and coordinated through the 412 OG/CC.
- Medium risk test plans will be jointly approved by the owning AFRL TD director or designee, and the 412 TW/CC.
- High risk test plans will be jointly approved by the AFRL/CC and the AFFTC/CC.
- A formal approval briefing may be requested by any approval authority for any test plan but is required for all HIGH risk test plans to both AFRL/CC and AFFTC/CC.
- For all MEDIUM and HIGH risk assessed test plans, a 412 OG member will be assigned to support the AFRL research program with test planning and integration with AFFTC technical, safety and flight test execution processes.

- For all MEDIUM and HIGH risk assessed test plans, all coordination comments will be resolved before final approval of test execution and made available to both AFRL and AFFTC leadership.

Because of this additional review and coordination or approval requirement, AFRL PMs must ensure that time for this additional AFFTC review and coordination is included in their test schedule. Reference **Section 5.3** for the test schedule. Taxi and flight testing is not authorized until after the T&E office verifies that all TAA signoffs and 412 OG review and approvals are complete, and the planned flight activity has been entered into the AFRL flight schedule.

6.5. Aircrew and UAV or Radio Controlled Model Operator Qualifications:

DEFINITION: AFFTC will assist AFRL with establishing and approving pilot and operator qualification, training and currency standards for AFRL research programs involving flight activities. These cover both manned and unmanned vehicles.

DISCUSSION: Operator qualifications will be included in the test plan. AFRL and the 412 OG will assess the pilot or UAV operator qualifications for each test program to determine if the experience level is adequate. Identify the operators and provide their ratings, experience, and currency to the AFRL Flight T&E office prior to the AFRL SRB; the AFRL Flight T&E office will provide this information to the 412 OG for their review.

6.6. Mishap Reporting with 412 OG:

DEFINITION: Any mishap that occurs during an AFRL flight test activity must be reported. A mishap is defined in **Section 5.6**.

DISCUSSION: The 412 OG will provide AFRL mishap reporting and accountability assistance as the flight authority for all flight operations. Reporting and accountability will be in accordance with AFI 91-202/AFMCS1, AFI 91-204, and AFI 91-206(I), *Participation In A Military or Civil Aircraft Accident Safety Investigation* and the AFMC and AFFTC supplements. Any aircrew member involved in a Class A or B mishap will be administratively grounded by 412 OG/CC. Any aircrew member involved in a Class A mishap will not perform aircrew duties in AFMC assigned aircraft until reauthorized in writing by HQ AFMC/A3. Any aircrew member involved in a Class B mishap will not perform aircrew duties in AFMC assigned aircraft until re-authorized in writing by the 412 OG/CC. AFRL will retain mishap accountability and investigation responsibilities unless transferred IAW AFI guidance. AFRL/SE will notify the 412 TW of any AFRL flight mishaps. See **Para** 5.6 for a detailed discussion of mishaps and the AFRL process to reclear flights following class C-E mishaps.

6.7. Preflight Schedules:

DEFINITION: Flight schedules shall be approved by the owning AFRL division chiefs and provided to the 412 OG before flight.

DISCUSSION: No later than the day prior to each flight (or series of flights), the AFRL PM shall notify their AFRL division chief or deputy division chief of all flight activities to obtain authorization for the daily flying schedule. Once division approval is granted, the PM will send this information to the AFRL Flight T&E office.

The AFRL PM shall provide advance notice for upcoming flight activities to the AFRL Flight T&E office. The PM will provide the following information:

- Flight date(s).
- Scheduled take off and landing times.
- Airfield.
- Test area.
- Aircraft owner and type.
- AFRL flyers.
- AFRL vehicle operator (manned and unmanned vehicles).

Send flight schedule information to the AFRL T&E office (global address: AFRL DL-Flight T&E, e-mail address: afrldl-flighttestandevaluation@wpafb.af.mil). The AFRL T&E office will forward the schedule to the 412 OG.

6.8. Postflight Summaries of AFRL Flight Operations:

DISCUSSION: PM will track all vehicle flight hours (includes flight time for military, government, and contractor vehicles) and provide this information at the end of each flight week

to the AFRL Flight T&E office summarizing all flight activity for that week. The AFRL Flight T&E office will provide a combined AFRL summary to the 412 OG.

6.9. Total System Cost:

DEFINITION: The total system cost of a program includes vehicle cost (manned or unmanned), ground station cost, and any other items that are part of the total test.

DISCUSSION: At the SRB, the PM will identify the total system cost to include the cost of the vehicle, ground station, and other test specific equipment. This value will be included in the SRB minutes.

The cost of the program affects two topics:

- AFRL programs that fly with airborne or ground station assets valued at over $200,000, are assessed as MEDIUM or HIGH risk, or fly under an FAA approved certificate of authorization (COA), will comply with all applicable AFI 10 and 11 series instructions. The 412 OG may implement further restrictions on any other flying programs to ensure AFI compliance, regardless of cost, risk, or COA status.
- If a mishap occurs, the cost of the program assists to determine the class of mishap.

6.10. Flight Test Cards:

DEFINITION: All flight and flight-associated ground test events (where aircraft moves under its own power, such as taxi) will be conducted from approved test cards.

DISCUSSION: The following discusses test card content and test card approval.

Test cards should contain the following minimum information as applicable:

- Aircraft configuration with weight and balance.
- Aircraft operating limits critical to the test points.
- Test limits.
- Initial conditions.
- Challenges and response items as required.
- Flight test technique.
- Allowable data bands or test condition parameter tolerances.
- Data acquisition system settings.
- Expected results.
- Risk level.
- Go or no-go criteria.
- Test card number.

Test cards must be approved no more than one week prior to each mission:

- For LOW risk tests, the AFRL division chief (or designee) will approve the test cards; 412TW approval is not required.
- For MEDIUM risk tests, the AFRL TD director (or designee) and the 412 OG/CC (or equivalent) will approve the test cards.
- For HIGH risk tests, the AFRL/CC or AFRL/CV, and the 412TW/CC will approve the test cards.
-

SRB assessed risk level	AFRL Approval	AFFTC Approval
High Risk	AFRL/CC or CV	412 TW/CC
Medium Risk	TD Director or delegate (Deputy / Associate Director)	412 OG/CC or equivalent
Low Risk	TD Division Chief or Delegate (Deputy Division Chief)	412 TW approval is not required

To obtain 412 OG or 412 TW approval for test cards for medium and high risk tests, send the test cards to the AFRL T&E office which will submit them to the 412 OG. Test cards may be submitted simultaneously to the appropriate AFRL and 412th approval authorities. To expedite the test card approval process within the 412 TW, draft test cards should be included for

preliminary review when the final test plan is submitted to the 445 FLTS for TAA approval. Updates to draft test cards can be provided prior to the applicable flight activity when submitted for final approval.

Once a mission is briefed and the mission slips due to a non-safety related reason, but otherwise remains unchanged, the appropriate test card approving official(s) may elect to grant approval by telephone or e-mail on an "until flown" basis for up to one week after original approval. If more than one week has passed since the original approval, the approval authority must be contacted and the date on the signature updated.

6.11. GFR.

DEFINITION: A GFR is a rated U.S. military officer or government civilian in an aviation position who has been delegated the responsibility for approval of contractor flights, procedures, crewmembers or personnel, and ensuring contractor compliance with applicable provisions of AFI 10-220(I), has attended a GFR training course, and has been certified as a GFR. This approval is required whenever the government has assumed some of the risk of loss for the vehicle.

DISCUSSION:

AFRL will engage a GFR for all AFRL programs that require GFR oversight. The assigned GFR will coordinate with both the AFRL and the 412 OG when performing their duties.

A GFR is required for an AFRL program for the following scenarios:

- Contract includes ground or flight risk or aircraft flight risk clauses.
- Program includes aircraft (including UAVs) that will be delivered to the government under contract.
- Program includes aircraft (including UAVs) that have been furnished by the government to a contractor and the AFRL CO determines that the government is assuming any risk of loss or damage during contractor operations.
- Contract specifies that contractor is subject to the provisions of AFI 10-220(I), *Contractor's Flight and Ground Operations*.
- Contract requires AFRL contractor flyers to fly on government vehicles or pilot government vehicles (including UAVs).

If GFR services are required, AFRL contracting will include the requirement in the AFRL contract. When DCMA reviews the AFRL contract, DCMA will obtain the GFR support.

If any of the above scenarios fit the AFRL program, the PM must obtain GFR approval for vehicle or contractor flight.

Additional information:

- For flights originating on any military installation, contact AF Material Command / Standardization and Evaluation Division (HQ AFMC/A3V), DSN 872-7885.
- For any operations originating off a military installation, contact DCMA Aeronautical Division, DSN 955-4208.
- AFRL is not required to pay for GFR services off a military installation. If the work is on a military installation, payment depends on the arrangement with the DCMA Aeronautical Division.

Governing Documents: AFI 10-220(I).

Chapter 7

LOGISTICS SUPPORT

7.1. Logistics Support for AFRL Programs.

DEFINITION: Logistics support is a disciplined approach to the management of technical activities necessary to integrate support considerations into system and equipment design, acquire and provide the required support during test and evaluation phase, and for any follow-on employment of the system and equipment.

DISCUSSION: When laboratory managers or engineers first encounter the words "logistics support", they most likely believe it applies only to program office type efforts, not laboratory efforts. By understanding what logistics support is, they can determine what support they require for their programs.

First, examine the first three goals of Logistics Support:

- Determine the support requirements to meet performance and readiness objectives.
- Integrate these support requirements into the design process.
- Keep the system or equipment operating in a cost-effective manner by providing the necessary supportability resources for both operating and maintaining the system and equipment.

Next, review the following list of the ten elements for managing Integrated Logistic Support:

- Maintenance Planning
- Manpower and Personnel
- Supply Support
- Technical Data
- Support Equipment
- Training and Training Support
- Computer Resources Support
- Facilities
- Packaging, Handling, Storage, and Transportation
- Design Interface

Below are definitions of several of the elements so there will be a greater realization of the involvement of logistics support in laboratory test and development programs:

- Maintenance Planning: The process conducted to evolve and establish maintenance concepts and requirements for the equipment and system.
- Technical Data: Scientific or technical information recorded in any form (such as manuals and drawings). Documentation of computer programs and related software (computer programs and related software are excluded as is financial data related to contract administration).
- Support Equipment: A part of support equipment consideration is test, measurement, and diagnostic equipment (TMDE) support. TMDE support is the calibration and repair of test equipment used to test, measure, calibrate, evaluate, inspect, or otherwise examine materials, supplies, equipment, and systems. This would include most data acquisition equipment. Because data is the purpose of most tests, accurate measurements are of the

utmost importance. To ensure accuracy is maintained, compliance with AFI 21-113, *Air Force Metrology and Calibration (AFMETCAL) Program* and TO 00-20-14-WA-1, *AF Metrology and Calibration Program* is necessary. One of the more important subjects in the AFI and the TO concerns commercial calibration of TMDE. Only AFMETCAL, coordinated through the AFMC Precision Maintenance Equipment Laboratory (PMEL) functional manager, may approve commercial calibration of TMDE. The default position of AF policy on calibration of TMDE is when an organic AF capability exists, the item must be calibrated organically.

- Design Interface: The relationship of supportability requirements to other design parameters such as performance and schedule. There are many sub-elements of Design Interface (e.g., Reliability, Systems Safety, Quality, and T&E).

From this discussion, the PM can see that logistics support is involved with many areas, including test and evaluation, of equipment and subsystem development programs, T-2 modifications, and experimental aerospace vehicle developments. To ensure supportability is considered early in a test or modification program, managers and engineers should contact their Directorate Logistic Support focal points for guidance or assistance.

Governing Documents: Defense Acquisition Guidebook, AFI 10-602, *Determining Mission Capability and Supportability Requirements*; AFMCI 99-103.

7.2. DCMA.

DEFINITION: The DCMA is a DoD organization. The mission of DCMA is to provide contract administration and management services in support of the AF, Army, and Navy.

DISCUSSION: The DCMA manages contracts, by the use of established offices, within a specific geographic area. It is through these offices that PM can obtain support, such as QA, on their contracts. For more information on DCMA and its services, go to **http://www.dcma.mil/**.

7.3. QA Support.

DEFINITION: The role of DMCA QA personnel is to verify that the contracted products and services conform to contract quality requirements.

DISCUSSION: The DMCA has personnel assigned in numerous regions who have the ability to provide field technical and administrative support to the prime contracting agency. QA is one area of support that can be very useful to laboratory PM for assisting on PCIs and follow-up on PCI action items on T-2. This support can be obtained by submitting a request to the responsible contract administration office for the assigned contractor (see sample letter in **Attachment A4.5**). The details of the required support should be mutually understood prior to submitting the official request to ensure everyone is in agreement.

7.4. Programmed Depot Maintenance.

DEFINITION: Depot modification and maintenance normally scheduled on a calendar time cyclic basis.

DISCUSSION: AFMC is responsible for management of the USAF depot maintenance program for aerospace vehicles. The ALC system PM and item manager is responsible for planning the depot maintenance program. Organizations that are industrially funded or receive direct appropriations for required maintenance provide the ALC with fund citation and certification of funds availability. Depot maintenance (except for emergency requirements) is accomplished on a planned basis to facilitate the programming of funds, material, manpower, facilities, and other resources.

Governing Documents: TO 00-25-4, *Depot Maintenance of Aerospace Vehicles and Training Equipment*, DoDI 5000.2, DLAD 5000.4, *Contract Management.*

Chapter 8

AEROSPACE VEHICLES

8.1. Use of FAA Certified Aircraft.

DEFINITION: FAA certified aircraft are aircraft that are commercial FAA certified or are a commercial derivative hybrid. A commercial derivative hybrid aircraft is a fixed or rotary wing aircraft procured as a TC COTS developmental or non-developmental item and subsequently modified to meet AF mission requirements.

DISCUSSION: Modifications to AF aircraft that have FAA certification shall not cause the aircraft to lose its FAA certification. The following is a general discussion of the FAA process.

Field Approval Certification:

The FAA Flight Standards District Office (FSDO) will become involved in the modification. A FAA Aviation Safety Inspector (ASI) from FSDO will review the documentation used for the modification and certify the documentation as being FAA certified. Once this is completed, the aircraft owner completes a FAA Form 8130-6, *Application for Airworthiness Certificate.* This form is used for applying for an FAA airworthiness certificate. The FAA will issue a Restricted Airworthiness Certificate (8130-7) for most modifications that support test data collection; however, for major or hazardous modifications to aircraft, following Federal Aviation Regulation (FAR) 21.35a, they will issue an Experimental Airworthiness Certificate. Under Part 21 of FAA 14 Code of Federal Regulations (CFR), the owner may receive a restricted airworthiness certificate if he has a special purpose aircraft (e.g. aircraft designed to fight forest fires, monitor weather, or conduct aerial surveying). The aircraft should already carry a FAA Standard Certificate for normal flying. In some cases an aircraft may have multiple certificates, a standard certificate for commercial use for which it was designed and a restricted or experimental certificate when it is used for a special purpose.

Type Certification:

When mission requirements make FAA certification extremely costly or impractical to meet parts from FAA CFR, an aircraft may be partitioned (engines, avionics, fuselage) into FAA Type Certified (TC) and “government approved” portions. This keeps the FAA inspector from using or needing the services of the FAA Designated Engineering Representative (DER), which could be costly to the program. Unique mission equipment and modifications that do not affect airworthiness are appropriate examples for government approval procedures versus FAA certification. In this case, the government’s portion would be reviewed according to the government process for modifying aircraft, and the responsible government organization would be the approval authority. The AF would document the modification on an AFTO Form 95, *Significant Historical Data* for the aircraft. The FAA will certify their portion and supply the appropriate airworthiness certificate. The government would certify their portion by signing off AFMC Form 273.

Governing Documents: AFI 21-101; AFPD 62-4, *Standards of Airworthiness for Passenger Carrying Commercial Derivative Transport Aircraft*; AFPD 62-5, *Standards of Airworthiness for Commercial Derivative Hybrid Aircraft*; AFPD 62-6; FAA 14 CFR Parts 91, 21 & 43.

8.2. Use of Aero Club Aircraft.

DEFINITION: Aero club aircraft may be used to conduct AFRL tests.

DISCUSSION: Aero club aircraft are an alternate aircraft source for conducting AFRL flight tests. Because of mishap accountability and liability issues, AFRL may need a MOU with the owning organization to transfer mishap accountability from the aero club to AFRL. Contact the AFRL T&E POC since several MOUs already exist. If one does not exist, a MOU may be created if required.

Several criteria must be met before using the aero club aircraft:

- A SRB and TRB must be conducted for these tests either by AFRL (if we have mishap accountability during the tests) or the aircraft's owning command with AFRL participation and approval. If the owning command does not conduct these reviews, then AFRL will conduct them.
- The AFRL pilot and crewmembers must have flight authorization from the AFRL flight authority.
- No passengers are allowed; persons may fly to assist the PM if they have flight authorization from the AFRL flight authority.
- Pilots must be qualified aero club members.
- Modifications must not cause the aircraft to lose FAA certification.

Governing Documents: AFI 34-217, *Air Force Aero Club Program*; AFI 91-204, AFPD 62-4.

8.3. Use of UAVs.

8.3.1. Scope: This guidance applies to all UAVs including, but not limited to, RPV, R/Cs, remotely operated aircraft (ROA), and uninhabited combat aerial vehicles (UCAV).

8.3.2. Items to Consider: This section presents some items for the tester to consider at the start of the program.

- MOU/PI Document:

  - When the test will be located at an AFMC test center, use the PI document to specify test requirements. Include appropriate items from the discussions below in the PI.
  - When the test will use government but non-AFMC test resources, use a MOU to document the test requirements and agreements and address the applicable issues discussed in the rest of this chapter.
  - Refer to **Para** 2.2 in this manual for additional information on MOUs.

- Mishap Accountability: Contact the PM directorate safety office to determine who has mishap accountability. Present this information to the SRB.
- Liability: The issue of who has liability in case of an incident must be determined early in the test. Refer to **Para** 3.3.6 for a discussion of liability.
- Frequency Requirements: Frequency requirements for the vehicle and communications must be addressed early in the program. Determine if the frequencies for the flight controls and the FTS are available at the test site. Discuss frequency requirements with the test site frequency manager. Refer to **Para** 3.3.15 in this manual for a discussion of spectrum management and a list of spectrum management POCs. Local spectrum management POCs can assist the PM.
- FTS/Flight Termination Procedure (FTP): Depending on the complexity of the vehicle, flight termination may involve procedures used to return the vehicle to a loss of link waypoint, position flight controls to force land the vehicle after loss of link, or an independent system to destroy the vehicle in flight. Consider these issues when designing the FTS/FTP:

  - FTS design for vehicles flown at MRTFB locations is subject to the requirements in the Range Council Commander (RCC) 319-99 document.
  - When determining the type of FTS/FTP to use, some questions that should be considered are: Does the vehicle have any heritage? Has it had successful flight demonstrations? If so, how many? Are the vehicle systems redundant or better? Does it have any other safety systems (lost link modes, recovery systems, "go to" functions, etc.) that have been demonstrated?
  - Indicate on a map of the test area the flight termination boundary for the flights. This termination boundary, or “kill line”, represents the point where the FTS/FTP must be initiated to prevent the UAV from flying or impacting off the test area.

- Test Plan Approval: All test plans require a technical and a safety review. To determine if AFRL is responsible for these reviews and how to conduct them, refer to **Chapter 5** of this manual. The 412 TW oversight requirements in **Chapter 6** also apply to UAV programs.
- Operator Certification: Operator certification is required to determine if the operator is qualified to fly the specific vehicle and to ensure the operator understands airspace protocol.
- T-2 Modifications: T-2 modifications are temporary hardware or software changes or alterations to aerospace vehicles, including drones, remotely powered vehicles and UAVs. If AFRL owns the vehicle or has mishap accountability or liability for the vehicle, an AFRL CCB is required. The AFRL T-2 modification process for UAVs is discussed in **Para** 4.7 of this manual.
- Environmental Impact Statement: Consult with directorate safety office to determine if an environmental impact statement is required. For example, a statement may be required for use or storage of fuel at the test location or protection from chemicals used during the tests. Present the statement at the TRB.
- Line of Authority: Document in writing who is in charge of the entire test and of parts of the test if there are separate activities occurring within the test. Identify

who has final authority to activate the FTS/FTP. All decision-making personnel must be identified to all test members before the start of the test. All decision-making personnel must be able to communicate with all test members. Define communication protocol.

8.3.3. Approval to Use Airspace: The airspace use approval guidance for operating UAVs, or to use the FAA term, Unmanned Aircraft System (UAS), is found in the FAA Order JO 7610.4M, *Special Operations (FOUO),* **Section 9,** *Unmanned Aircraft System (UAS) Operations in the NAS*. Regardless of size or speed of the UAS, all flight operations (government or contractor conducted) will be conducted as stated in this FAA Order. UASs include, but are not limited to, UAVs, RPVs, and R/Cs. Contact the AFRL Flight T&E office for further guidance and assistance. Under no circumstances will UAV, RPV or model aircraft flights be conducted under the hobbyist guidance in FAA Advisory Circular 91-57.

For flights in the National Airspace System (NAS), obtain an approved COA from the FAA. COA applications are submitted electronically using a restricted access FAA website. Contact the AFRL Flight T&E office for assistance with the COA process.

AFRL has a MOA with the 88th Air Base Wing (ABW) at WPAFB to use the fenced flying range in area B behind the museum. A checklist for flying at WPAFB is presented in **Attachment A9.6**.

Governing Documents: FAA Order JO 7610.4M*),* AFI 13-201, RCC 319-99 *Flight Termination Systems Commonality Standards.*

8.4. Lease or Loan Agreements.

DEFINITIONS:
Lease: Any government-owned aircraft provided to a contractor under a lease agreement for use in conjunction with a specific contractor need. Aircraft are usually leased to a contractor for the contractor's use. Purpose Identifier Code: XY.

Loan: Military aircraft provided to other federal government departments or agencies on a temporary basis. Purpose Code Identifier: NY.

Bailment: Any government–owned aircraft provided to a contractor under a bailment agreement for use in conjunction with a specific contractual requirement. Aircraft are usually bailed to a contractor to perform government contract work. Purpose Identifier Codes: EB, ED, DN, VN, and XU.

DISCUSSION:

- Requirements for loan aircraft must be submitted to HQ AFMC/A3O. Use the format in AFI 16-402/AFMCSUP1, *Aerospace Vehicle Programming, Assignment, Distribution, Accounting and Termination.*

- Requests for a leased aircraft are submitted by the lessee to ASC Central Support Contracting Division (ASC/PKW). Use the format and procedures in AFI 64-103, *Leasing Non-Excess USAF Aircraft, Aircraft-Related Equipment and Other Personal Property to Non-Government Organizations*.
- Lease aircraft do not necessarily support a government contract or requirement. They are provided to the industrial concern to perform tests that the government feels will prove beneficial.
- Loan aircraft should be required only if an AFMC or MAJCOM aircraft is not available or will not satisfy program requirements.
- Unless directed otherwise, lease and loan agreements will require that modifications to the vehicle conform to the current versions of MIL-M-27733 and MIL-STD-882 and shall state who has modification approval authority.
- If a lease or loan agreement does not specifically require complete demodification upon lease or loan termination, or if the aerospace vehicle is to be returned in a modified configuration, a complete T-2 modification package will accompany the aerospace vehicle.
- The lease or loan agreement will state who has mishap accountability and liability, who conducts the SRB and TRB, and who is the TAA for the flight test plan.
- Bailed aircraft refers to aircraft provided to a contractor in support of a government contract. When this inventory type (Bailed) aircraft is placed on contract, it is done as GFP, which is the more familiar term.
- The responsible SPM will coordinate on all contracts, lease, and loan agreements involving aircraft requiring modification installation, flight test or demodification and for which the government has assumed the risk of loss, damage or destruction. This includes aircraft that have not undergone final acceptance by the government and aircraft provided as GFP. Programs with lease or loan vehicles may require a GFR. The PM must consult with AFRL contracting and DCMA to determine if a GFR is required and obtain the needed services.

Governing Documents: AFI 16-402, *Aerospace Vehicle Programming, Assignment, Distribution, Accounting, and Termination,* AFI 16-402/AFMCSUP1, AFI 64-103, AFMCI 21-126.

8.5. MDS Designator for Aerospace Vehicles.

DEFINITION: MDS is the official designation for aerospace vehicles used to represent a specific category of aerospace vehicles for operations, support and documentation purposes.

DISCUSSION:

Status Prefix (Optional): Indicates a nonstandard use of an aerospace vehicle, such as test, experimental, etc. Appears to the immediate left of the modified mission symbol or basic mission symbol.

Modified Mission (Aircraft only) (Optional): Indicates modifications to the basic mission of the aircraft. Appears to the immediate left of the basic mission symbol.

Basic Mission (Required): Identifies the primary function and capability of an aerospace vehicle. For standard vehicles (e.g. fighters, bombers, etc.), it appears to the immediate left of the design number separated by a dash.

Design Number (Required): Identifies major design changes within the same basic mission. It appears to the immediate right of the basic mission symbol, separated by a dash.

Series (Required): Identifies the production model of a particular design number and later models representing major modifications that significantly alter the aerospace vehicle systems components. Starting with "A", it appears to the immediate right of the design number.

For example: The MDS for the AFRL Variable Stability In-Flight Simulator Test Aircraft is (VISTA) NF-16D.

- N – Status Prefix: Special test (permanent).
- F – Basic Mission: Fighter.
- 16 – Design Number: 16th MDS requested for an aircraft with a fighter mission under the current MDS reporting system.
- D – Series: Fourth production model of the F-16.

All the AF MDS designator symbols are listed in AFI 16-401(I), *Designating And Naming Defense Military Aerospace Vehicles.*

Governing Documents: AFI 16-401(I), AFI 16-402.

8.6. Purpose Identifier Code.

DEFINITION: A two-letter code that describes the predominant purpose or mission for each aircraft in the AF inventory. Previously known as assignment codes.

DISCUSSION: The USAF aerospace vehicle inventory has two major categories, active and inactive. Active aerospace vehicles are assigned to commands for AF operational, support, training and test missions. Inactive aerospace vehicles are assigned for other than operational mission requirements. Each aerospace vehicle has a purpose identifier code. The codes for all aircraft are listed in AFI 16-402. The ones of interest to AFRL test people are:

- EB – Contractor test GFP.
- EH – Test support.
- EI – Test.
- NY – Loan.
- TX – Permanently grounded.
- XY – Lease.
-

The purpose identifier codes for all AFMC aircraft are listed in "Summary of AFMC Aircraft", published quarterly by HQ AFMC/A3O.

Governing Document: AFI 16-402.

Chapter 9

MISSILE, TARGET AND MUNITIONS REQUIREMENTS

9.1. Air-To-Air Missiles and Aerial Targets Request and Expenditure Report.

DEFINITIONS: Request: Provisions are available for laboratory managers and engineers to obtain air intercept missiles and aerial targets to be used for test purposes. Presently the air intercept missiles are AIM 120, 9, 7 and the aerial targets are MQM-107, BQM-34, BQM-167, and QF-4.

Expenditure Report: A semi-annual report listing the missiles and targets expended.

DISCUSSION: HQ AFMC/A3O conducts an annual call for engineers to identify their air-to-air missiles and aerial targets requirements. The call occurs each winter around December and January. The forecast call covers the next eight fiscal years (FY) and does not include the current FY. The first two years are considered "firm" with the remaining six years as best estimates. Normally, HQ AFMC/A3O contacts the AFRL Flight T&E office for inputs; the AFRL Flight T&E office will contact the AFRL PM for inputs and provides consolidated Laboratory inputs to HQ AFMC/A3O. HQ AFMC/A3O then submits the requirements to HQ AF T&E, Policy and Programs (HQ USAF/TEP) where the allocation of missiles and targets is made. Managers and engineers are later notified by the laboratory focal point of their allocation.

Items to consider:

- All munitions, suspension and release equipment, or munitions test equipment not currently in the USAF inventory or inventory items that require modification to support testing require safety certification by the USAF Nonnuclear Munitions Safety Board. Contact the Air Armament Center System Safety Office (AAC/SES) at DSN 872-7340 or DSN 872-7306.
- Target allocations not used in one FY do not carry over to the next FY. Managers and engineers must resubmit their projected requirements annually if they wish to receive an allocation. If the target requirement slips into the next FY, notify HQ AFMC/A3O as soon as possible. HQ AFMC/A3O will attempt to have the requirement added in the next FY allocation if time permits; otherwise, the target request will be processed out-of-cycle.
- Missile allocations not used in one FY do not carry over to the next FY. The one exception to this is when the missile has already been shipped to the test location and it has been configured (with telemetry or other special equipment) for the test. Managers must notify HQ AFMC/A3O by 15 October of their intent to "rollover" unused missile allocation from the previous FY to the next FY. Rollover missiles are coordinated through HQ Air Force Test and Evaluation (HQ USAF/TE) for inventory accounting purposes. Managers and engineers must resubmit their projected requirements annually if they wish to receive an allocation.
- Requests for other services' missiles and test ranges should be included in the forecast, but they must be annotated as such. These requests must be fully justified as to why your program cannot use AF resources (missile and range). HQ/AFMC/A3O and

HQ/USAF/TEP will scrutinize these requests for valid test requirements. For test programs that show a justifiable need, HQ USAF/TEP will then initiate action to obtain the missiles and seek approval for use on non-AF ranges.

- Missiles cannot be sent to a contractor. To obtain a missile for use at the contractor's plant, the contractor must first contact Headquarters AFMC Base-Level Maintenance and Munitions Division (HQ AFMC/A4M) for necessary approval actions.

Shortly after submitting the projected requirements, the AFRL PM must contact the Munitions Allocation System Office (MASO) to set up a supply account. Locations are:

WPAFB – Bldg. 4052, Area C, 88 EMS/LGMW, DSN 787-7510/7511

Eglin – Bldg. 1211, 46 EMS/LGMWMK, DSN 872-2260/2164

If you do not have a MASO available, contact the HQ AFMC Munitions Office (HQ AFMC/A4MW), AFMC.Munitions@wpafb.af.mil, DSN 986-3962

When the missile allocation is made, the MASO also receives a copy of this notification and automatically goes out to get the missiles for the signed account. Upon receipt of the missile(s), the MASO will advise the PM of follow-on actions required (e.g., When are the missile(s) to be provided to the PM? How should the missile be disposed of when testing is completed?).

HQ AFMC/A3O requires a semi-annual report on the missiles and targets that have been expended during the previous 6 months. The AFRL Flight T&E office is notified of this requirement in late March and September. The laboratory T&E focal point then contacts the individuals who had known allocations in that time period, collects any inputs and submits them to HQ AFMC/A3O for a consolidated AFRL response.

The formats for Missile/Target Expenditure Requests and the Semi-Annual Missile/Target Expenditure report will be included in the forecast request from HQ AFMC/A3O and are also found in AFI 99-108, *Programming And Reporting Aerial Target And Missile Expenditures In Test And Evaluation, RCS: HAF-TEP (SA) 7101*.

Governing Documents: AFI 91-205, AFI 99-108.

9.2. Munitions Request.

DEFINITION: Provisions are available for laboratory managers and engineers to obtain ground and air-to-ground munitions for test purposes.
DISCUSSION: To obtain munitions for test program use, contact the base MASO to establish an account and notify the MASO of your requirements. The MASO is the organization that takes action to fill the requirement and store the munitions allocated. MASO locations are listed in **Para** 9.1.

Governing Documents: AFI 99-108.

Chapter 10

INFORMATION COLLECTIONS, RECORDS AND FORMS/IMTs

10.1. Forms.

10.1.1. Prescribed Forms:

AFRL Form 12, *Test Hazard Analysis;* AFRL Form 16, *Safety Validation Item/Request for Information;* AFRL Form 17, *Program Introduction Cover Sheet;* AFRL Form 18, *Physical Configuration Inspection/Post Modification Acceptance (PCI/PMA) Discrepancy Form;* AFRL Form 19A, *Safety Review Board;* AFRL Form 19B, *Technical Review Board;* AFRL Form 22, *Flight Readiness Review;* AFRL Form 23, *Post Modification Acceptance Report;* AFRL Form 24, *AFRL Air Force and Non-Air Force Test Support Requirements,* AFRL Form 29, *AFRL Test Safety Mishap Worksheet,* AFRL Form 20, *Lessons Learned,* AF Form 813, *Request for Environmental Impact Analysis,* AFRL Form 11, *UAV Maintenance/Repair Log,* AFRL Form 26-1, *AFRL UAV Modification Document,* AFRL Form 26, *AFRL UAV Modification Log* .

10.1.2. Adopted Forms:

FAA Form 8130-6, *Application for Airworthiness Certificate;* AF Form 702, *Individual Physiological Training Record (DD Form 2005, Privacy Act Statement serves)*; AF Form 813, *Request for Environmental Impact Analysis;* AF Form 1042, *Medical Recommendations for Flying or Special Operational Duty***;** AF Form 1067, *Modification Proposal;* AFTO Form 95, *Significant Historical Data;* AFTO Form 781A, *Maintenance Discrepancy and Work Document;* DD Form 254, *Contract Security Classification Specification, Department of Defense;* DD Form 1494, *Application for Equipment Frequency Allocation***;** AFMC Form 3, *Component Safety of Flight Certificate;* AFMC Form 81, *Flight Authorization for Maintenance Engineering Support Personnel (MESP)***;** AFMC Form 243, *Temporary Release for Flight Certificate;* AFMC Form 244, *T-2 Modification Configuration Control Board Directive;* AFMC Form 272, *Physical Configuration Inspection (PCI) Report;* AFMC Form 273, *Final Release for Flight Certificate;* AFFTC Form 5416, *AFFTC Flight Request / Approval;* AFFTC Form 5499**,** *Contractor Request for Flight Approval;*

G. SCOTT COALE
Colonel, USAF
Vice Commander

Attachment 1

ABBREVIATIONS AND ACRONYMS

A1.1. Abbreviations and Acronyms

ACRONYM	NAME
AAC	Air Armament Center
ACO	Administrative Contracting Officer
AEDC	Arnold Engineering Development Center
AF	Air Force
AFFMA	Air Force Frequency Management Agency
AFFTC	Air Force Flight Test Center
AFMC	Air Force Materiel Command
AFOTEC	Air Force Operational Test and Evaluation Center
AFRC	Aircraft Flight Risk Clause
AFRL	Air Force Research Laboratory
AFTO	Air Force Technical Order
ALC	Air Logistics Center
ASC	Aeronautical Systems Center
ASI	Aviation Safety Inspector
CCB	Configuration Control Board
CDR	Critical Design Review
CDRL	Contract Data Requirements List
CFR	Code of Federal Regulations
CM	Configuration Management
COTS	Commercial off The Shelf
CO	Contracting Officer
COA	Certificate of Authorization
COMSEC	Communications Security
CONUS	Continental United States
DCMA	Defense Contract Management Agency
DER	Designated Engineering Representative
DFARS	Department of Defense Federal Acquisition Regulation Supplement
DID	Data Item Description
DM	Data Manager
DoD	Department of Defense
DoDD	Department of Defense Directive
DT&E	Developmental Test and Evaluation
EMC	Electromagnetic Compatibility
EMI	Electromagnetic Interference
EO	Electro-Optical
EW	Electronic Warfare
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation

FCC	Federal Communications Commission
FCT	Foreign Comparative Testing
FLTS	Flight Test Squadron
FOUO	For Official Use Only
FRR	Flight Readiness Review
FSDO	Flight Standards District Office
FTP	Flight Termination Procedure
FTS	Flight Termination System
FY	Fiscal Year
GFP	Government Furnished Property
GFR	Government Flight Representative
GFRC	Ground and Flight Risk Clause
HUD	Head Up Display
IMR	Independent Modification Review
ITT	Integrated Test Team
JSA	Job Safety Analysis
JT&E	Joint Test and Evaluation
LFT&E	Live Fire Test and Evaluation
LOA	Letter of Agreement
LTO	Lead Test Organization
MAJCOM	Major Command
MASO	Munitions Allocation System Office
MCEB	Military Communications Electronics Board
MDS	Mission Design Series
MESP	Maintenance/Engineering Support Personnel
MIL-SPEC	Military Specifications
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MRTFB	Major Range and Test Facility Base
NAS	National Airspace System
NASA	National Aeronautics and Space Administration
NDI	Non-Destructive Inspection
O&M	Operations and Maintenance
O&S	Operating and Support Hazard Analysis
ORM	Operational Risk Management
OSD	Office of the Secretary of Defense
OSS&E	Operational Safety, Suitability & Effectiveness
OT&E	Operational Test and Evaluation
P	Permanent
PCI	Physical Configuration Inspection
PD	Position Description
PDR	Preliminary Design Review
PHA	Preliminary Hazard Analysis
PI	Program Introduction
PM	Program Manager
PMA	Post Modification Acceptance

POC	Point of Contact
PR	Purchase Request
PTO	Participating Test Organization
QA	Quality Assurance
R&D	Research and Development
R/C	Radio Control Model
RDT&E	Research Development Test and Evaluation
RF	Radio Frequency
RFA	Radio Frequency Authorization
RFI	Request For Information
RFP	Request for Proposal
ROA	Remotely Operated Aircraft
RPO	Responsible Program Office
RPV	Remotely Piloted Vehicle
RTO	Responsible Test Organization
S&T	Science and Technology
SDE	Statement of Duties and Experience
SHA	System Hazard Analysis
SOC	Statement of Capability
SOO	Statement of Objectives
SOW	Statement of Work
SPM	System Program Manager
SRB	Safety Review Board
SSHA	Subsystem Hazard Analysis
SVI	Safety Validation Item
T&E	Test and Evaluation
T-1	Temporary 1 Modification to provide increased capability for a special mission
T-2	Temporary 2 Modification to support research, development, test and evaluation
TAA	Test Approval Authority
TC	Type Certified
TD	Technology Directorate
TDY	Temporary Duty
TEMP	Test and Evaluation Master Plan
TEO	Technology Executive Officer
TESTREP	Test Representative
THA	Test Hazard Analysis\
TIM	Technical Interchange Meeting
TMDE	Test, Measurement and Diagnostic Equipment
TO	Technical Orders
TPS	Test Pilot School
TPWG	Test Planning Working Group
TRANSEC	Transmission Security
TRB	Technical Review Board
TRR	Test Readiness Review

UAV	Unmanned Aerial Vehicles
UAS	Unmanned Aircraft System
UCAV	Uninhabited Combat Aerial Vehicle
UDS	Universal Documentation System
USAF	United States Air Force
VISTA	Variable Stability In-Flight Simulator Test Aircraft

Attachment 2

GOVERNING DOCUMENTS

A2.1. Department of Defense Governing Documents.

DoDD 3200.11, *Major Range and Test Facility Base (MRTFB)*
DoDD 4650.1, *Policy for Management and Use of the Electromagnetic Spectrum*
DoDD 5000.1, *The Defense Acquisition System*
DoDI 5000.2, *Operation of the Defense Acquisition System*
DoD 5000.3-M-4, *Joint Test and Evaluation Procedures Manual*

A2.2. Air Force Governing Documents.

AFI 10-220(I), *Contractor's Flight and Ground Operations*
AFI 10-602, *Determining Mission Capability and Supportability Requirements*
AFI 11-202V3, *General Flight Rules*
AFI 11-401, *Aviation Management*
AFI 11-401/AFFTCSUP1, *Aviation Management*
AFPD 16-3, *Priorities for Resources Management*
AFI 16-301, *US Air Force Priority System for Resources Management*
AFI 16-401(I), *Designating and Naming Defense Military Aerospace Vehicles*
AFI 16-402, *Aerospace Vehicle Programming, Assignment, Distribution, Account and Termination*
AFI 21-101, *Aircraft and Equipment Maintenance Management*
AFI 33-118, *Electromagnetic Spectrum Management*
AFI 33-201V1, *Communications Security (COMSEC)*
AFMAN 33-120, *Electromagnetic Spectrum Management*
AFI 34-217, *Air Force Aero Club Program*
AFPD 62-4, *Standards of Airworthiness for Passenger Carrying Commercial Derivative Transport Aircraft*
AFPD 62-5, *Standards of Airworthiness for Commercial Derivative Hybrid Aircraft*
AFPD 62-6, *USAF Aircraft Airworthiness Certification*
AFPD 63-12, *Assurance of Operational Safety, Suitability, and Effectiveness*
AFI 63-104, *The SEEK EAGLE Program*
AFI 63-1101, *Modification Management*
AFI 63-1201, *Assurance of Operational Safety, Suitability and Effectiveness*
AFI 64-103, *Leasing Non-Excess USAF Aircraft, Aircraft-Related Equipment and Other Personal Property to Non-Government Organizations.*
AFI 90-901, *Operational Risk Management*
AFPD 91-2, *Safety Programs*
AFI 91-204, *Safety Investigations and Reports*
AFI 91-205, *Non Nuclear Munitions Safety Board*
AFI 91-206(I), *Participation In A Military or Civil Aircraft Accident Safety Investigation*
AFI 99-103, *Capabilities Based Test and Evaluation*
AFI 99-106, *Joint Test and Evaluation Program*

AFI 99-108, *Programming And Reporting Aerial Target And Missile Expenditures In Test And Evaluation, RCS: HAF-TEP (SA) 7101*

A2.3. AFMC Governing Documents.

AFI 11-301V1 AFMCSUP1 (I), *Aircrew Life Support (ALS) Program*
AFI 11-401/AFMCSUP1, *Aviation Management*
AFI 16-402/AFMCSUP1, *Aerospace Vehicle Programming, Assignment, Distribution, Accounting and Termination*
AFMCI 21-119, *Objective Center/Test Wing Aircraft Maintenance Management Policy*
AFMCI 21-126, *Temporary 2 (T-2) Modification of Aerospace Vehicles*
AFI 48-123/AFMCSUP1, *Medical Examinations and Standards*
AFMCI 63-1201, *Implementing Operational Safety, Suitability, and Effectiveness (OSS&E) And Life Cycle Systems Engineering*
AFMCPD 63-4, *Software Requirements Review Process*
AFMCPAM 63-101, *Risk Management*
AFMCI 65-602, *Uniform Reimbursement and Pricing Procedures*
AFI 91-202/AFMCS1, *The U.S. Air Force Mishap Prevention Program*
AFMCI 99-103, *Test Management*

A2.4. AFRL Governing Documents.

AFRLI 25-201, *Formation and Oversight of Alliances*
AFRLI 91-101, *Laboratory System Safety Program*
AFRLI 91-2021, *Laboratory Mishap Prevention Program*

A2.5. Miscellaneous Governing Documents.

AFFTCI 99-1, *Test Plans*
AFFTCI 91-5, *AFFTC Test Safety Review Process*
AFFTCI 99-103, *AFRL Program Oversight*
TO 00-25-4, *Depot Maintenance of Aerospace Vehicles and Training Equipment*
FAA Order JO 7610.4M, *Special Operations*
MIL-STD-882D, *System Safety*
MIL-STD-27733, *Modification and Marking Requirements for Test Equipment in Aerospace Vehicles and Related Support Equipment*
DI-NDTI-80566A/T, *Test Plan*
DI-MISC-81562, *Temporary Non-Standard Modification Documentation and Marking Requirements for Test Equipment in Aerospace Vehicles and Related Ground Support Equipment Defense Acquisition Guidebook*
DLAD 5000.4, *Contract Management*
RCC 319-99 *Flight Termination Systems Commonality Standards*
TO 00-20-1, *Aerospace Equipment Maintenance Inspection, Documentation, Policies, and Procedures*

A2.6. Location of Documents
DoD: **http://www.dtic.mil/whs/directives**
AF: **http://www.e-publishing.af.mil**
AFMC: **https://www.afmc-mil.wpafb.af.mil/pdl/afmc/**
AFRL: **https://afrl.af.mil/RESOURCES/Library/afrl_all/pubs/default.asp**
TOs:
https://www.toindex-s.wpafb.af.mil/AFTOX_DOCUMENTS/searchto_a.cfm
FAR: **http://farsite.hill.af.mil**
MIL STD: **http://assist.daps.dla.mil/online/start/**
Defense Acquisition Guidebook: **http://akss.dau.mil/dag**

A2.7. Location of Forms.

The AFMC forms are available electronically through the AFMC Publishing Distribution Library: **https://www.afmc-mil.wpafb.af.mil/pdl/afmcforms**
The AFRL forms are available electronically through the AFRL livelink
The DD Form 1494 can be found at: **http://www.jsc.mil/scs_dmr/scs_dmr.asp**
The FAA form can be found at: **http://forms.faa.gov/forms/faa7711-2.pdf**

A2.8. Location of Forms within this Manual

DD Form 254, *Contract Security Classification Specification*
DD Form 1494, *Application for Equipment Frequency Allocation*.....3.3.15
AF Form 702, *Individual Physiological Training Record (DD Form 2005, Privacy Act Statement serves)* 6.3
AF Form 813, *Request for Environmental Impact Analysis* *8.0*
AF Form 1042, *Medical Recommendations for Flying or Special Operational Duty*..... 6.3
AF Form 1067, *Modification Proposal* 4.4
AFTO Form 781A, *Maintenance Discrepancy and Work Document* 4.3.4, 4.3.5
AFMC Form 3, *Component Safety of Flight Certificate* 4.6
AFMC Form 81, *Flight Authorization for Maintenance Engineering Support Personnel (MESP).* 6.3.1
AFMC Form 243, *Temporary Release for Flight Certificate*..... 4.3.1, 4.3.7
AFMC Form 244, *T-2 Modification Configuration Control Board Directive* 4.3.2, 4.3.3
AFMC Form 272, *Physical Configuration Inspection (PCI) Report* 4.3.4
AFMC Form 273, *Final Release for Flight Certificate*..... 4.3.1, 4.3.7
AFRL Form 11, *UAV Maintenance/Repair Log*.....4.7.2
AFRL Form 12, *Test Hazard Analysis* 5.3, 5.5
AFRL Form 16, *Safety Validation Item/Request for Information* 4.3.2, 4.3.3, 4.3.8
AFRL Form 17, *Program Introduction Cover Sheet*..... 2.1
AFRL Form 18, *Physical Configuration Inspection/PMA Discrepancy Form* 4.3.4, 4.3.5
AFRL Form 19A, *Safety Review Board* 5.3
AFRL Form 19B, *Technical Review Board*..... 5.2
AFRL Form 20, *Lessons Learned*.....3.2.2, A6.4
AFRL Form 22, Flight Readiness Review..... .....4.3.6
AFRL Form 23, *Post Modification Acceptance Report*.....4.3.5
AFRL Form 24, *AFRL Air Force and Non-Air Force Test Support Requirements* 3.2

Attachment 3

SAMPLE AGENDAS

Note: These sample agendas are very general. Tailor the agendas to your specific program.

A3.1. Preliminary/Critical Design Review

PRELIMINARY/CRITICAL DESIGN REVIEW FOR THE (NAME) PROGRAM
DATE, LOCATION, TIME OF MEETING
(NAME), CCB CHAIRMAN

SUBJECT	BRIEFER
GENERAL Welcome Introduction of participants and recorder Agenda Discussion of SVI/RFI form	Air Force
PROGRAM OVERVIEW Status Schedule	Air Force or Contractor
MODIFICATION OVERVIEW	Contractor
DISCUSSION OF DESIGN Detailed discussion of Part I PDR or Part II CDR data package Other relevant documents/information	Contractor
GOVERNMENT ONLY MEETING Review of submitted SVI/RFIs	Air Force
MEETING WITH CONTRACTOR Review each SVI/RFI Determine resolution (who, when, how) Discuss any additional topics	Air Force and Contractor
PDR/CDR APPROVAL* AFMC Form 244 Letter to contracting	Air Force
ADJOURN	All

*__Note__: The CCB chairman may approve the Part I/Part II data package at the conclusion of the PDR/CDR, or he may choose to have an additional review later and approve it then.

A3.2. PCI

PCI FOR (NAME) PROGRAM
(DATE, LOCATION, TIME)
(NAME), TEAM LEADER

SUBJECT	BRIEFER
GENERAL Welcome Introductions Agenda Discussion of AFRL Form 18 and AFTO Form 781A Order of Conduct	Air Force
PCI OBJECTIVES	Air Force
MODIFICATION OVERVIEW Brief modification overview Briefing of items/areas modified	Contractor
STATUS OF MODIFICATION Contractor's Quality Assurance	Contractor
QUALITY ASSURANCE INSPECTION	Air Force
INSPECTION AREAS Documentation/Drawings Personnel Available (Engineering and Maintenance) Component Safety of Flight Certificates (AFMC Form 3 for group B components)	Contractor Aircraft
CONDUCT OF PCI Document discrepancies Oversee on-the-spot fixes Submit write-ups to government team leader	Air Force
POST PCI MEETING (Government) Discussion of discrepancies (AFRL Form 18) Finalize list of open items Team Leader logs the open items Determine discrepancies for AFTO Form 781A	Air Force

MEET WITH CONTRACTOR	Air Force/Contractor
Discuss Discrepancies	
Determine Corrective Action	
Arrange for follow-up action by Air Force Field Office Inspector	
COMPLETE AFMC FORM 272	Air Force
ADJOURN	Air Force

A3.3. PMA

PMA FOR THE (NAME) PROGRAM
(DATE, LOCATION, TIME OF MEETING)
(NAME), TEAM LEADER

SUBJECT	BRIEFER
GENERAL	
Introductions	All
Agenda	Air Force
Discussion of AFTO Form 781A and AFRL Form 18	Air Force
PMA PURPOSE	Air Force
MODIFICATION OVERVIEW	Contractor
STATUS OF MODIFICATION	Contractor
INSPECTION AREAS	Contractor
Functional Checkout of System Operation	
EMC/EMI Tests	
Operation/Maintenance/Inspection Instructions	
Work cards	
CONDUCT OF PMA	Air Force
Record findings on AFRL Form 18	
Oversee on-the-spot fixes	
Submit write-ups to government team leader	
POST PMA MEETING (Government)	Air Force
Discussion of discrepancies	
Finalize list of open items	
Team Leader logs the open items	
Determine discrepancies for AFTO Form 781A	

BRIEF RESULTS TO CONTRACTOR Discuss discrepancies Determine additional action required Request follow-up support by DCMD	Air Force
COMPLETE AFRL FORM 23	Air Force
ADJOURN	All

A3.4. Technical Review Board

TECHNICAL REVIEW BOARD (TRB) FOR THE (NAME) PROGRAM
(DATE, LOCATION, TIME OF MEETING, MEET ME NUMBER)
(NAME), TRB CHAIRMAN

SUBJECT	BRIEFER
GENERAL	
Introduction of participants and recorder	All
Purpose of TRB	Air Force
OVERVIEW Program Overview Test Objectives Vehicle Description	Contractor or Program Manager
TECHNICAL REVIEW	Contractor/ Air Force
Test Objectives	
Specific Objective	
Measures of Performance	
Success Criteria	
Data Requirements	
Test Conditions, Procedures, and Techniques	
Specific conditions and procedures	
Technical Go/no-go criteria	
Instrumentation	
Limitations/constraints	
Test schedule	
Review of environmental assessments	
Support requirements	
Add items as required from Section **5.2**	
TEST PLAN FLIP THROUGH	All
CONCLUSIONS Follow-up Actions	All

Complete AFRL Form 19B

ADJOURN

A3.5. Safety Review Board

SAFETY REVIEW BOARD FOR THE (NAME) PROGRAM
(DATE, LOCATION, TIME OF MEETING)
(NAME), SRB CHAIRMAN

SUBJECT	BRIEFER
GENERAL	
Introduction of participants and recorder	All
Purpose of SRB	Air Force
• Discussion of safety review process	
• Discussion of hazard/risk levels	
• Discussion of Test Hazard Analysis form	
• Mishap Reporting Process and Mishap Response	
• Identification of LTO or RTO	
• Identification of Who Has Mishap Accountability	
OVERVIEW (Very brief)	Contractor or
Program and Objectives	Program Manager
Vehicle Description, Weights, Performance	
Total System Cost (Vehicle, Ground Station, Etc.)	
Modification and Instrumentation	
SAFETY REVIEW	Contractor/ Air Force
Test Results from Previous Tests	
Review of Vehicle Modification Approvals	
Government Modification Approval (T-2 Modification)	
FAA Modification Approval	
Government Review of Remaining Uncertified Modification Items	
Operational Documents	
Partial Flight Manuals	
Flight Restrictions	
Program Specific Aircrew Actions	
Master Power Switch, Circuit Isolation	
Other	
Aircrew Checklists	
Operator Checklists	
Test Equipment Operating Instructions	
Vehicle Limitations	
Unique Maintenance Procedures	
Other	

Program Test Plan (Discuss in detail) - Note: the test plan discussion should include the following topics:

- Program Objectives
- Success Criteria
- Flight Profiles (altitudes, speeds, duration, location)
- Test Plan Deviations
  - Allowable Deviations
  - Authorization to Deviate
- Safety Go/No-Go Lists, Alternatives, and Authorizations
  - Test Equipment
  - Operations
  - Weather Minimums
- FTS / Procedure
- Airspace Approval/Airspace Sharing
- Operational Control (Who's in charge?)
  - Operator
  - Airspace/Ground
  - Program Bellybuttons (by name – who is in charge of duties listed in test plan?)
- Communication Protocol
- Chase or Photo Aircraft
- "What if?" Lists
- EMC/EMI Results
- THA
  - Identified and New
  - Test Specific and General

TEST PLAN FLIP THROUGH

ADDITIONAL TOPICS All

- Agreements and Coordination with Participating Organizations
- Air Force/Contractor Aircrew Flight Approval
- Pilot/UAV Operator Qualifications/Certification/Limitations/ Training or Currency Requirements
- Safety of Flight Certificates – Government or FAA
  - Component and Vehicle Safety of Flight Certifications
  - Carry on Equipment Safety of Flight Certification
  - Identification of remaining uncertified items
  - Operating Restrictions
- Mishap Accountability/Mishap Reporting
- Liability
- GFR certification of flight operations
- Change of Custody Process/Documentation
- Security Issues
  - Classification of program, data, personnel, etc
  - Actions required

Frequency Management
MESP Flight Authorizations
Requirements
Test Card Approval
Daily Flight Schedule

CONCLUSIONS All
Resolution of Open THAs
Follow-up Actions
Determination of Overall Test Risk Level
Approval Levels at AFRL and 412 OG
Complete AFRL Form 19A

ADJOURN

Example Risk Assessment Matrix

	HAZARD SEVERITY CATEGORY			
	Catastrophic	*Critical*	*Marginal*	*Negligible*
HAZARD PROBABILITY	May cause death, system loss	May cause severe injury, severe occupational illness, or major system/ facility damage	May cause minor injury, minor occupational illness, or minor system/facility damage	May cause less than minor injury occupational illness or system/facility damage
FREQUENT Likely to occur frequently during the test	1	3	7	13
PROBABLE Will occur several times during the test	2	5	9	16
OCCASIONAL Likely to occur sometime during the test	4	6	11	18
REMOTE Unlikely, but possible to occur during the test	8	10	14	19
IMPROBABLE Highly unlikely to occur during the test	12	15	17	20

Hazard Probability: The SRB members subjectively assess the hazard probability. Minimizing procedures are taken into consideration of the assessment.

Hazard Severity Category: This is a qualitative measure of the hazard's effect. Severity is assessed with all minimizing procedures and corrective actions in place.

Low risk: Tests or activities which present no greater risk than normal operations after appropriate controls have been applied. For the example matrix above, this would be 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, and 20.

Medium risk: Tests or activities which present a greater risk to personnel, equipment, or property than normal operations even after the appropriate controls have been applied. For the example matrix above, this would be 5, 6, 7, 8, and 9.

High risk: Tests or activities which present a significant risk to personnel, equipment, or property even after all precautionary measures have been taken. For the example matrix above, this would be 1, 2, 3, and 4.

Note: During the safety review, personnel will use these guidelines, expert opinions, engineering analysis, and common sense to assign risk levels to each identified hazard, individual test event, and the test as a whole.

Governing Document: AFFTCI 91-5.

A3.6. FRR

FRR FOR THE (NAME) PROGRAM
(DATE, LOCATION, TIME OF MEETING)
(NAME), CCB CHAIRMAN

SUBJECT	BRIEFER
GENERAL Welcome Purpose of FRR Introduction of participants and recorder Review of agenda SVI form discussion (use, procedures, submission)	Air Force
PROGRAM OVERVIEW	Air Force
MODIFICATION OVERVIEW	Contractor
DISCUSSION OF MODIFIED AREAS (e.g. structures, hydraulics, cooling system, propulsion, electrical avionics, software, etc.)	Contractor
GROUND TESTS	Contractor
SIMULATION TESTS	Contractor
FLIGHT TESTING Test plans Flights/locations Pilots Ground control Telemetry data, instrumentation, etc.	Contractor
SAFETY/TECHNICAL REVIEWS RESULTS	Air Force
INDEPENDENT MODIFICATION REVIEW RESULTS AND RECOMMENDATIONS	IMR Chairman
GOVERNMENT ONLY MEETINGS Individual teams meet for discussion and Preparation of SVIs	Air Force
FRR BOARD REVIEWS SVIs All Government teams attend Finalize SVIs and other comments	FRRB Chairman

Log SVIs	
RECONVENE FRR	FRRB Chairman
Discuss SVIs with contractor	
Determine disposition of SVIs	
Determine any follow up action required	
COMPLETE AFRL FORM 22	
APPROVAL OF RELEASE FOR FLIGHT*	CCB Chairman
Temporary or Final	

*__Note__: The release may be signed at the FRR or at a later date - the CCB chairman makes the decision when to sign it.

Attachment 4

SAMPLE LETTERS

A4.1. Designation of Responsible and Lead Test Organizations

A4.1.1. Designation of RTO

MEMORANDUM FOR AFRL/(Directorate)

FROM: AFRL/ (Program Manager's Branch)

SUBJECT: RTO Designation for the (program name)

1. Per AFRLPAM 99-103, *AFRL Flight Test and Evaluation*, the ITT for each AFRL program recommends an RTO to the director (or as delegated) of the directorate owning the program for his approval. The (program name) ITT requests the (proposed RTO) be designated as RTO for the (program). (Name and location of PTO, if requested), will be a PTO for the (program).

2. (Proposed RTO) will conduct the safety and technical reviews using (proposed RTO) processes. AFRL will participate in both reviews. AFRL may request additional topics be addressed to ensure the AFRL safety and technical processes are fulfilled. After the (proposed RTO) review is completed, the AFRL SRB chairman will present the results to the AFRL and AFFTC test approval authorities for final test plan approval. AFRL and AFFTC approval must be obtained prior to any (program name) taxi or flight tests.

3. Program Objective and Goals: (Short discussion)

4. Program Management: (Short discussion)

_____

PROGRAM MANAGER'S NAME
(Program name) Program Manager

Note: Prior to sending this letter to the director, the PM must obtain concurrence of the nomination from all test program participants (AFRL SRB chairman, proposed RTO, proposed PTO, other participating AFRL directorates, and any other participating organizations). The easiest way is to include an endorsement for each coordinator with the letter. The last endorsement is the PM's director concurring with the RTO nomination. See sample endorsement below.

Sample Endorsement:

1st Ind to AFRL/(Program manager's office symbol) RTO) Designation for the (Name) Program

AFRL/(Signer's Office Symbol)

MEMORANDUM FOR AFRL/(Program Manager's Director or delegate)

I concur / do not concur with the nomination of (proposed RTO) for the (name) program.

_____

(NAME)
Organization
(Name) Program

A4.1.2. Designation of Lead Test Organization

MEMORANDUM FOR AFRL (Program Manager's Division)

FROM: AFRL/(Program Manager's Directorate)

SUBJECT: Assignment of Lead Test Organization for (Name of Program)

1. The LTO is the lead government entity that is qualified and responsible for the planning, safety, execution and reporting on R&D testing for S&T programs. Per AFRLPAM 99-103, *AFRL Flight Test and Evaluation*, the AFRL/(Directorate) director,(or as delegated) designates the LTO for AFRL/(Directorate) programs.

2. I designate AFRL/(Program Manager's Division) to be the LTO for the (program name). The program manager is (name, office symbol, and phone). The LTO is responsible for conducting all required test processes as described in AFRLPAM 99-103.

Signature Block of Director or delegate

Note: Prior to sending this letter to the director, the program manager must obtain concurrence of the nomination from all test program participants (AFRL SRB chairman, proposed LTO, other participating AFRL directorates, and any other participating organizations). The easiest way is to include an endorsement for each coordinator with the letter. The last endorsement is the program manager's director concurring with the LTO nomination. See sample endorsement below.

Sample Endorsement:

1st Ind to AFRL/(Program manager's office symbol) Lead Test Organization (LTO) Designation for the (Name) Program

AFRL/(Signer's Office Symbol)

MEMORANDUM FOR AFRL/(Program Manager's Director or delegate)

I concur / do not concur with the nomination of (proposed LTO) for the (name) program.

_____

(NAME)
Organization
(Name) Program

A4.2. Establishment of Configuration Control Board

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESEARCH LABORATORY
WRIGHT-PATTERSON AIR FORCE BASE OHIO 45433

DATE

MEMORANDUM FOR (OFFICE SYMBOL OF PROPOSED MEMBER)

FROM: (OFFICE SYMBOL OF CCB CHAIRMAN)

SUBJECT: Selection to the AFRL/(Program Office's Directorate) Configuration Control Board

1. As the Air Force Research Laboratory (AFRL) designated CCB Chairman for the (Name) Program, I am establishing membership to the CCB.

2. I request that (proposed member's name) be assigned as the member on the CCB in the technical specialty of (technical area). This individual has been contacted and has indicated willingness to participate.

3. Your support to this laboratory program is greatly appreciated. If you have any questions on the CCB process, please call the AFRL Flight Test and Evaluation office at DSN 785-4404. If you have any program questions, please contact the Program Manager, (Name), AFRL/(symbol), and (phone number).

(NAME), Chairman
Configuration Control Board
(Name) Program

A4.3. Establishment of Physical Configuration Inspection/Post Modification Inspection Teams

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESEARCH LABORATORY
WRIGHT-PATTERSON AIR FORCE BASE OHIO 45433

DATE

MEMORANDUM FOR AFRL/(PROPOSED TEAM LEADER'S AND MEMBERS' OFFICES)

FROM: AFRL/ (CCB Chairman's Office)

SUBJECT: Selection to (PCI and/or PMA) Team

1. As the Configuration Control Board (CCB) Chairman for the (Name) Program, I appoint (Name, Office Symbol) to serve as the team leader for the conduct of the (Physical Configuration Inspection and/or Post Modification Acceptance) of the modification. To also serve on the team, I have selected to following individuals:

NAME	OFFICE/PHONE	TECHNICAL AREA

2. The PM and Team Leader will provide additional information. Your support to this program is greatly appreciated.

(Name of Chairman)
Chairman, Configuration Control Board
(Name of Program)

A4.4. Establishment of Safety Review Board

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESEARCH LABORATORY
WRIGHT-PATTERSON AIR FORCE BASE OHIO 45433

DATE

MEMORANDUM FOR (MEMBER'S 3 LETTER OFFICE SYMBOL)

FROM: (SRB CHAIRMAN'S OFFICE SYMBOL)

SUBJECT: Selection to the Safety Review Board (SRB) for the (Name) Program

1. As the Air Force Research Laboratory (AFRL) SRB Chairman for the (Name) Program, I am establishing membership to the board.

2. I request that (proposed board member name) be assigned to serve as the SRB members in the technical specialty of (specialty). (Member name) has been contacted and has indicated willingness to participate.

3. Your support to this laboratory program is greatly appreciated. If you have any questions on the SRB process, contact the AFRL Flight Test and Evaluation office at DSN 785-4404; if you have any questions on the program, contact the PM, (name/symbol/phone).

(NAME)
Chairman, Safety Review Board
(Program Name)

A4.5. Request for Quality Assurance Support from DCMA Office

DEPARTMENT OF THE AIR FORCE
AIR FORCE RESEARCH LABORATORY
WRIGHT-PATTERSON AIR FORCE BASE OHIO 45433

DATE

MEMORANDUM FOR DCMA
(Contact AFRL Directorate Logistics Office for Address)

FROM:

SUBJECT: Request For Government Contract Quality Assurance (QA) Action

Contract No ____, (Name Of Contractor)

1. I request that the DCMA's office Quality Assurance Representative on the subject contract provide QA support to the Air Force Program Office (AFRL/__) for the (name) program. This support is to provide coverage of the T-2 modification on the (type of aircraft) government furnished aircraft and will require involvement in the following efforts:

(***NOTE***: These are examples only. Any support requested should be discussed with the QA Representative and the AFRL logistics office prior to submitting a request.)

a. Review the T-2 modification Part I and Part II data packages.

b. Conduct ongoing physical configuration inspections and final physical configuration inspection of the installation, including demodifications. Of particular importance would be those areas that are inaccessible or difficult to inspect at the final physical configuration inspection by the program office.

c. Be present when power on and hydraulic checks are performed for final system checkout.

d. Witness weight and balance for each T-2 modification and review the weight and balance forms after completion of entries by the contractor. Also perform periodic checks of these forms as deemed necessary.

e. Perform surveillance to assure compliance to maintenance requirements stated in the contract.

2. In addition, perform other special support that may be required in the review and inspection for approval by the Air Force of the (contractor's name) Program.

(Name), Program Manager
(Name of Program)

Attachment 5

SAMPLE OUTLINES

A5.1. IMR Charter.

(SAMPLE) CHARTER BETWEEN THE IMR TEAM AND THE CCB OF THE (AFRL PROGRAM NAME) T-2 MODIFICATION

PURPOSE: (The SPM for weapon system being modified) will conduct an independent technical review from a safety of flight point of view of the major T-2 modification made to the (name of vehicle) in support of the (AFRL program name). The review is to determine that all safety-of-flight aspects of the program have been reviewed / considered and that the (name of vehicle) can enter into the flight test program with acceptable technical risk.

AUTHORITY: The AFRL Configuration Control Board (CCB) chairman, (name), declared the modification made to the (name of vehicle) a major T-2 modification. (AFRL/____) is the Responsible Program Office (RPO) and modification agency for this T-2 modification. (Name) is the AFRL PM. The IMR is implemented in accordance with AFMCI 21-126. The IMR is not intended to replace the modification agency review function and has no direct authority over that agency or its contractor, but it will make pertinent recommendations to the program office and submit a final assessment concerning flight safety/risk assessment to the PM and CCB chairman

The IMR Team will perform a detailed review of the following modification areas to determine and assess safety risk:
1. Engineering design changes (including software)
2. Impacted air vehicle characteristics
3. System and flight safety
4. Drawings and analyses
5. Test plans
6. Data
7. Changes to related flight manuals, operating and maintenance instructions

The RPO will:
1. Brief the IMR Team on the program requirements, status, schedule, system design, and any current concerns or issues that have a bearing on the IMR's activities
2. Provide or make available to the IMR all relevant documentation
3. Make disposition on all issues identified by the IMR Team prior to first flight

METHOD OF OPERATION:

The IMR operating procedures as they relate to the modified air vehicle system are:
1. The IMR Team will review relevant documentation relating to the development effort.

2. The IMR Team, with prior coordination with the PM, may take part in the PDR, the CDR, the PCI, the PMA, the technical and safety review boards and the FRR.

3. During reviews or on-site meetings, any problem or potential problem will be verified as to its validity on site, if possible. Any problem that is not resolved on site will be formally documented in a RFI/SVI form and presented through the IMR chairman to the designated RPO focal point who will obtain a formal RPO position and ensure resolution of the concern. The completed RFI/SVI form will then be given to the IMR. To the extent possible, IMR findings and recommendations will be resolved with the RPO and appropriate contractors during the on site-meetings.

4. IMR team members will only request documentation or additional information through the IMR chairman or the SPM IMR focal point.

5. The IMR Team will terminate its engagement with the RPO once the following are completed:

a. Closure has been reached with the RPO on all IMR generated SVIs. A SVI with an agreed to closure plan, which the RPO will execute, is acceptable.

b. The IMR recommends to the CCB airworthiness approval/disapproval.

CCB/IMR Interface: The two team chairmen and the PM should agree early in the program how to review and approve the large amount of data and documentation. This section can discuss the detailed process agreed to by these leaders.

1. Test Plans: Discuss review and approval process for the system/subsystem test plans prior to the tests. Define pass/fail criteria.

2. Safety/Hazard Analyses: Discuss review and approval process for the safety/hazard analyses.

REPORTING PROCEDURES: The IMR chairman will brief the findings and recommendations of the IMR to the RPO and CCB chairman. Also, the findings and recommendations of the IMR will be documented in a letter provided to the CCB chairman by the IMR chairman.

FUNDING: The RPO will provide all travel funding (and labor funding if required).

ADMINISTRATIVE: The IMR team will make their individual travel arrangements using travel information provided by the RPO.

PROVISIONS FOR CHANGE: This charter may be revised at any time during the (program name) to update/expand/alter the IMR interface with the RPO. The changes must be agreed upon by the PM, the IMR Chairman and the CCB Chairman.

SCHEDULE:

Event	Date

SIGNATURES:

_____	_____
AFRL Program Manager	Date
_____	_____
CCB Chairman	Date
_____	_____
IMR Chairman	Date

A5.2. ITT.

A5.2.1. Purpose and Characteristics of ITTs and ITT Charters.

This discussion and sample charter are from the AF T&E Guidebook.

The ITT is the overarching test management team that is co-chaired by representatives from the program office and the test organization. It is responsible for the T&E grand strategy that supports the program's acquisition process. The ITT may establish subgroups such as test integrated process teams (TIPT) for writing test plans, combined test forces (CTF) for test conduct, working groups for TRRs and test data reviews, and study groups for specific issues and problems.

The ITT charter must establish the working relationships among people so they can work together efficiently as a team. It must create a partnership between the PM, the testers, and others needed to support T&E. The ITT charter should be signed by fully empowered, working-level representatives who are most familiar with program needs, preferably at the O-6 level. The value of coordinating above this level may be questionable, especially if coordination will be delayed. The ITT charter should be short (i.e., 10 pages or less), focused on relationships, non-controversial, and free of extraneous material that could delay coordination. It should be completed first thing so the ITT can begin working together as early as possible. If there is any doubt about including any material in the charter, leave it out and place it in more appropriate documents.

The ITT Charter should not duplicate the contents and directions cited in other T&E documents such as the TEMP, test plans or AFIs, but only reference them if necessary. The primary focus should be on administrative direction that is generally not suitable for a TEMP, test plan, or AFI. It must address the tasks that AFI 99-103 and the DoD 5000-series leave to the discretion of PMs, testers and others, and what is unique about this ITT. The ITT charter should not become another list of previously published roles and responsibilities, nor should it include details about how the system will be tested. Extraneous materials, such as lists of items beyond the discretionary control of ITT members, should not be attached to ITT charters.

The ITT construct (with the program office and operational tester as co-chairs) is not the same as the CTF or TIPT constructs, but the ITT members may be the same due to the limited number of personnel available. Management of T&E from an ITT perspective will be different than conduct of T&E at the CTF level. Very briefly describe which subgroups will be formed (if known) and outline their functions, but do not embed charters for subgroups in the ITT charter.

To create greater efficiency, a single ITT may cover a number of related acquisition or sustainment programs. For example, an aircraft system may have many ongoing modifications from small to very large, each of which requires separate test plans and test activities. A single ITT could cover all these sub-programs to ensure more efficient allocation and scheduling of limited T&E resources. Another example could be to charter an ITT to manage all T&E for a family of systems or a group of similar information technology (IT) systems. If these programs have similar or interdependent content, then a single "umbrella ITT" may be the proper venue for managing T&E for all. In each case, the ITT's span of control should match its capacity for overseeing the T&E grand strategy and assigning responsibilities to subgroups.

Each organization should empower an alternate attendee to ensure their organization is properly represented. To conserve resources, attendees should consider using video or telephone conferencing capabilities when unable to attend in person.

A5.2.2. Recommended ITT Charter Outline. The following outline covers the primary subject areas for an ITT charter. The charter should concisely cite information necessary to understand the program and how the ITT will support that program. This list is not all-inclusive and may be modified as necessary.

1.0. Introduction.

1.1. Program(s) Covered. List the program(s) the ITT will oversee and give a brief history of the ITT since program inception. If this is a standing ITT, list when additional programs were added to the original ITT charter.

1.2. Authority. Cite the document(s) directing formation of the ITT and its responsibilities such as:

1.2.1. AFI 99-103.

1.2.2. Acquisition decision memorandum or other documents directing formation.

1.3. Program Description. Briefly describe the program(s) covered by the charter.

1.3.1. Other Key Program Information. Acquisition category (ACAT); on OSD T&E Oversight List; etc.

1.3.2. Acquisition Strategy Overview. Briefly describe the acquisition strategy and how the T&E strategy supports it.

2.0. ITT Mission, Scope, and Overarching Goals. What are the major reasons for having the ITT (reference AFI 99-103, **Para** 3.14).

3.0. ITT Membership and Responsibilities. List the ITT member organizations, their representatives and alternates, and how they will support development of the T&E strategy and other T&E matters. Build on the list of responsibilities in AFI 99-103 (but don't repeat them), and list those that are unique to this ITT and program.

3.1. SPO.

3.2. Operational Test Organization. This is AFOTEC unless it has been determined (IAW AFI 99-103) they will not be involved in conducting operational testing. If AFOTEC involvement determination has not been made, AFOTEC will be involved with all ACAT I, ACAT II, and OSD Oversight programs until the determination process is complete. Operational testers from the other Services and relevant AF MAJCOMs should also attend.

3.3. RTO. A representative from the DT&E community (i.e., the appropriate Product or Logistics Center Test Authority (CTA) or as designated by AFMC/A3F) should attend early meetings until the RTO is formally designated.

3.4. Associated SPOs. List any SPOs for associated systems that must be interoperable with the chartered system(s).

3.5. MAJCOM Operational Test Organization(s). Attend at their discretion if AFOTEC is the designated operational tester. As the program progresses, a transition from AFOTEC to MAJCOM should be anticipated.

3.6. PTO. Describe how JITC, AFC2ISRC, etc., will support the program's T&E activities.

3.7. Operational User(s). Assist with clarification of JCIDS documents and the development of CONOPS, strategies, and other operational plans.

3.8. HQ USAF Offices. Describe how HQ USAF offices will support the ITT's efforts.

3.9. OSD Offices. Describe how DOT&E, USD(AT&L) and others as required will support the ITT's efforts.

4.0. Formation of Sub-Groups. Describe the ITT subgroups that will support or conduct T&E such as CTFs, study groups, writing teams, data scoring boards, certification boards, etc. These groups will likely draw upon the same members and organizations as the ITT, but will have distinctly different functions and may have their own charters. Do not embed these charters within the ITT charter.

5.0. Administrative Matters.

5.1. Frequency of Meetings.

5.2. Attendance.

5.3. Meeting Minutes.

5.4. Action Items.

6.0. ITT Charter Updates. ITT charters should be reviewed for currency soon after each milestone or major decision review, for each new increment that is started, and when additional associated systems are added to or taken from the ITT.

7.0. Coordination and Signatures. The level of signature should generally be at the division chief or colonel level. Designate the person at the lowest practical level who is empowered to speak for the organization.

8.0. Conflict Resolution. When ITT members disagree on problems or issues, they should broker agreements in the spirit of compromise for the good of the program. If the co-chairs cannot resolve the issue within the ITT, the issue should be raised to the organizational leadership for resolution. In all instances the ITT will comply with governing guidance and directives.

A5.3. PI Outline.

Note 1: This outline contains many suggested topics shown to trigger your thoughts to cover all necessary topics. However, many may not be applicable to your specific program. Tailor the outline to fit your program.

Note 2: Use AFRL Form 17 as the PI cover sheet. The form also identifies the required signatures.

PART I - PROGRAM INFORMATION

1. Background Information:

a. Summarize the operational requirements and development efforts leading to this test program.

b. Include any reference to prior or ongoing related test efforts.

c. Describe briefly the system and its purpose, employment, capabilities, and significant technical characteristics.

d. Explain briefly the operational characteristics of major components and the functional relationships between major components or subsystems of the complete system.

e. Identify any program references that would be helpful to the test organization in planning and supporting the test (contracts, technical data, reports, etc.).

f. Discuss any approved waivers or support agreements in effect or planned that pertains to the T&E program.

2. Test Objectives:

a. State and list, clearly and concisely, the primary test objective(s). Include any sub-objectives.

b. Identify the phenomena or events of prime importance expected to be observed or measured.

c. Identify any critical questions or issues to be answered by the test program.

3. Detailed Schedules:

a. List the desired schedule for test and evaluation events and corresponding dates. Highlight the critical milestones of the program.

b. Give specific dates for phases of activity, availability of equipment, and supporting resources for which the program office has contracted. Also, state any contract terms that specifies the quantity, quality, or timeliness of services to be provided by the test agency.

c. Identify clearly any critical milestones that, if not complied with, may cause contract extensions, overruns or delays in obtaining required data for follow-on efforts.

d. Provide a schedule, by fiscal quarter. Specify the number of flight hours, tests or sorties, indicating whether they are to be flown with live, inert or no external stores. Also, specify the number of successful tests required, the number of programmed launches, drops or captive flights, if applicable.

4. Responsibilities:

a. Specify the responsibilities assigned to each development, test, and participating organization in terms of test management, services, personnel, facilities, finance, materials, etc. (management reporting and technical reporting responsibilities are covered in Part VI). The PM has the overall management control and responsibility for development test and evaluation. Normally, the day-to-day control and supervisory responsibility/authority is delegated to the test agency supporting the program.
b. List each organization and contractor involved followed by the responsibilities levied on that organization/contractor. Responsibilities may include but are not limited to:

(1) Furnish aircraft, aircraft support or any special aircraft equipment.

(2) Perform necessary modification to the aircraft, providing modification installation material and components or parts.

(3) Provide, install or operate instrumentation and support equipment, either ground based or airborne.

(4) Perform ground checkout and maintenance of test equipment.

(5) Specify who conducts the test, provides a test director and operates the equipment, etc.

(6) Indicate the period when contractor services are required.

(7) Perform necessary demodification to the aircraft.

(8) Provide data reduction services.

(9) Provide logistics support.

(10) Identify management, mishap accountability and accident investigation responsibilities if two or more organizations are involved (reference AFI 91-204, **Para** 1.3).

(11) Identify who has CCB authority if a T-2 is involved.

(12) Identify who conducts the SRB if a test is involved.

5. Test Item(s) Description:

a. Describe the item(s) to be tested and briefly explain each item's function. .Include detailed information such as physical dimensions, weight, frequency requirements, radiation source, power requirements, modes of operation, and system operating parameters and characteristics when known. Include pictures, function block diagrams, wiring diagrams, dimensional drawings and any other data that assists in describing the item. For complex systems, consider including some of the above information in appendix form.

b. Describe the various test configurations to be evaluated.

c. Indicate any requirements for radomes, pod mounting, special holes, ducting, other unusual mounting provisions, etc.

6. Test Aircraft:

a. Identify any testbed aircraft requirements. Specify and justify the model, design and series of aircraft, if known. Specify and justify any requirements of the testbed aircraft, for example, production airframe, production engine(s), particular avionics arrangement, etc.

b. Identify any modifications to the aircraft that might have a bearing on the structural and aerodynamic characteristics of the aircraft, even though some of this may have been mentioned under test item description.

c. Specify weapons (if any) to be carried during the test, including type and model, and quantity to be carried (per sortie and total). If ammunition is required, specify type, caliber, and number of rounds.

d. Identify chase and target aircraft requirements.

e. Describe the performance envelope required of the test bed aircraft. State any performance envelope restrictions anticipated due to test items or aircraft modifications.

f. State the organization that has maintenance responsibility.

7. Safety:

a. Describe all potential hazards that could conceivably affect the safety of project equipment, the test aircraft, ground facilities, operation or maintenance personnel, real estate or surrounding populace. Safety factors to consider are listed in MIL-STD-882D. Consult with your Detachment Safety Office for assistance and coordination.

b. List any requirements for special storage, handling, transportation, and disposal of hazardous items or waste materials.

c. If MIL-STD-882D is called out on contract, attach copies of the following applicable analyses:

(1) Preliminary Hazard Analysis (PHA).

(2) Subsystem Hazard Analysis (SSHA).

(3) System Hazard Analysis (SHA).

(4) Operating and Support Hazard Analysis (O&S).

(5) THA.

8. Environmental/Ecological Impact:

State the potential impact of the test on the environment. The PM prepares an AF Form 813, *Request for Environmental Impact Analysis.* Instructions for completing this form are in AFI 32-7061, *Environmental Impact Analysis Process*. Consult with the detachment environmental office to determine the environmental requirement(s). Include this form with the PI.

9. Security Considerations:

a. Identify all necessary security considerations for the program regarding such items as: classified equipment, classified data, COMSEC, transmission security (TRANSEC), and TEMPEST requirements.

b. Attach the DD Form 254, *Contract Security Classification Specification*, DoD, if the test program is conducted on a contract delivered item.

c. Identify the security classification of the test equipment operation characteristics and results if a DD Form 254 is unavailable,

d. Attach copies of the security classification guide(s) as an appendix if a guide governing the program or any system involved in the test has been published.

PART II - TEST/MISSION OPERATIONAL REQUIREMENTS

10. Test Requirements/Procedures:

a. Describe the data to be obtained and the procedures for obtaining this data. Data acquisition accuracies should be specified, if known.

b. Identify the data necessary to validate test results. Explain the significance and quality required of this data.

c. State the desired test results for each test configuration.

d. Indicate any expected difficulties in obtaining valid data.

e. Include estimated number of test data collection hours or sorties required for the test. Give an estimate of the duration of each data pass and the number of passes per data sortie. State planned variations of test or flight conditions required (speed, altitude, maneuvers, etc.). A matrix of parameters in tabular form may be useful for describing the required sorties.

f. Identify specific interdependencies of all organizations involved, timing required, and critical areas controlling subsequent actions when applicable to cooperative tests,

g. Identify any required remote test locations and extent of TDY anticipated to support them.

11. Instrumentation/Communication Requirements:

a. Identify the instrumentation requirements for data collection and where the instrumentation is located (in test aircraft, chase aircraft, or ground facility).

b. Identify any instrumentation to be supplied by the Program Office. Specify any technical support required of the test agency for operation, maintenance, or service of this instrumentation.

c. Indicate action taken or required regarding frequency allocation, if applicable.

d. Specify any special weather instrumentation (standard or nonstandard) required at the test site or on the test vehicle.

e. Describe the data, format, and other details required to permit selection of suitable instrumentation by the test agency if instrumentation is not known.

f. Identify air/air and air/ground communication systems and recording requirements.

g. Specify any additional communication or recording requirements (videotape, event recording, etc.).

h. Identify telemetry data/range/encryption requirements per AFI 33-201V1.

12. Test Facilities:

a. Identify the ground facilities (range, ground terminal site, etc.) needed to support the test. If existing facilities cannot be identified, describe the type and characteristics required.

b. Describe any modification to an existing facility that is required to support the test.

c. Identify what is provided by the Program Office to support the test.

13. Real Time Data Display and Control:

a. Identify the types of data to be displayed and recorded.

b. Specify the number of parameters to be displayed and recorded and the desired formats.

c. Describe any real time data reduction requirements.

14. Photographic Requirements:

a. Specify the types of photography required (still, motion, color, etc.). State processing times required.

b. Specify whether on-board or chase aerial photography is required.

15. Meteorological Support: Identify special or unique weather support (personnel and equipment) requirements.

16. Biomedical Requirements:

a. Provide a comprehensive summary of all biomedical support requirements of the test program to include precautionary or preventative medicine measures required, if applicable. State any known or potential biomedical problems likely to be encountered in any phase of the test program.

b. Specify any support required of hospital services, physiological training units, or life support agencies.

17. Other Technical Support:

a. Identify requirements for support aircraft, sea craft or targets

b. Specify any other technical support requirements (geodetic or gravitational data, personnel training, etc.). State when any such support is required.

c. Identify recovery support.

d. Determine public affairs support.

PART III - DATA PROCESSING AND DISPOSITION REQUIREMENTS

18. Data Reduction:

a. State clearly who performs the actual data reduction.

b. Specify the types of data to be reduced and processed, (telemetry, weapon separation, radar tracking, head up display/electro-optical (HUD/EO) display video, takeoff and landing, photo theodolite, weapon scoring, etc.). State time requirements for processing each type of data.
c. Define any critical reduction and processing time requirements that, if not adhered to, could impact test schedule.

19. Data Storage: Identify special data storage requirements for classified data.

PART IV - BASE FACILITIES/LOGISTICS REQUIREMENTS

20. Personnel Assignment Information:

a. Specify numbers and categories (military officer, military enlisted, civil service, and contractor) of personnel and locations where they are assigned during the test program. Indicate the periods the personnel are at their respective locations.

b. List any other personnel assignment information that could aid the test agency in supporting the test program.

21. Administrative Supplies/Facilities and Requirements:

a. Identify administrative support that the test agency is required to provide such as housing, messing, transportation and vehicles, office space and equipment, ground communication services, etc.

b. Identify any unique administrative supply/facility requirements, (special storage space, controlled access areas, special workspace, electrical power services, water supply, fuels and lubricants, fire protection services, custodial services, etc.).

PART V - REPORTS AND OTHER SUPPORT REQUIREMENTS

22. Management Services: Specify the management reporting required of the RTO for maintaining management control and visibility of the test effort. Reporting needs vary from program to program. Reporting requirements are tailored to the management philosophy and needs of the PM. The two reports listed below request information that is normally required to manage a test effort.

a. Progress/Expenditure Report - "The RTO submits a (daily, weekly, or monthly) report to (Program Office Symbol) relating test progress the test schedule and funding. The report includes a summary - by functional category - of costs incurred to date, a narrative relating test progress to expenditures, and an estimate of costs to complete the Project Order."

b. Quick Response Report - "A quick response report is made to the PM (Name/Symbol/Phone number) advising of aircraft, facility or other support problems significantly impacting the test schedule. If scheduled test events within 24 hours are affected, a telephone report is made. Otherwise the reports may be sent by message."

23. Presentation of Test Results: State the type, classification, frequency and content of required test reports. Normally, a short-term effort requires only a formal, final report while a longer effort may require interim written reports and/or briefings. State restrictions to distribution.

24. Other Support Requirements and Considerations: State support requirements not covered elsewhere (calibration and maintenance of equipment, etc.).

A5.4. AFRL Flight/Taxi Test Plan Format To Be Used In Conjunction With DID DI NDTI 80566A/T.

Block 3: DESCRIPTION/PURPOSE

3.1 The test plan outlines the plans and test approach/objectives at every level of testing on systems or equipment. It provides the procuring activity with the test concept, objectives, approach, and success criteria.

Block 7: APPLICATION/INTERRELATIONSHIP

7.1 The DID contains the format and content preparation instructions for the data product generated by the specific and discrete task requirements as delineated in the contract.

7.2 This DID is applicable to system and equipment flight and ground tests that include tests, experiments, demonstrations on facilities or aerospace vehicles, where aerospace vehicles are defined as, but not limited to, manned vehicles, R/Cs, unmanned aerial vehicles (UAVs), and RPVs.

Block 10: PREPARATION INSTRUCTIONS

10.1 General. The test plan shall document in detail the contractor's plan for conducting tests and associated ground tests and analyzing the test results to show how the system will satisfy the program objectives in a safe and efficient manner.

10.2 Format. The plan shall be in the contractor's format.

10.3 Content

10.3.1 Title Page. The title page shall include the following:

a. Title of the test to be conducted
b. Identification of system being tested
c. Contractor's name
d. Contract number
e. Security classification
f. Distribution statement

10.3.2 Overview. Consists of purpose of test; program discussion; program objectives, metrics, and success criteria; background information; previous related tests (ground tests, simulations, other similar tests); critical technical and safety issues. The plan shall include the following:

10.3.3 Test Item Description. Consists of description of test item; vehicle description (size, shape, dimensions photo or drawing, weight, speeds, payload capacity, instrumentation, payload, power requirements/power available, etc.); vehicle modifications and configuration control

process/approval; autonomous flight control system description; other test/support equipment, and any other pertinent parameters.

10.3.4 Method of Test. Consists of detailed test approach and procedures; instrumentation; data requirements, processing, and analysis; test location (map or photo of area, test area marked on map, test patterns marked on map, location of test personnel and equipment on map); detailed discussion and description of each test (taxi, checkout, ground and flight test descriptions, number of tests/flights, purpose, objective and success criteria of each test/flight, vehicle configuration per flight, airspeeds, altitudes, flight patterns, detailed discussion of how each ground and flight test will be conducted from start to finish, contingency plans, etc.); communications (hand held radios – channels authorized/used, radio and test terminology, identification and responsibilities of test personnel, etc.); deviations requested from test plan; test and safety go/no go lists; test execution success criteria.

10.3.5 Special Procedures. Consists of unique maintenance procedures; test constraints or limitations; security procedures or guidelines to be observed; required special or unique tests.

10.3.6 Test Management. Consists of program schedule; planned test start and end dates; personnel (identification of personnel and responsibilities of each); required support.

10.3.7 Mishap Procedure and Reporting. Consists of discussion of emergency equipment and services available; discussion of process for handling toxic materials; mishap reporting procedures.

10.3.8 Attachments. Consists of test cards for each individual test; THA; pre and post flight/test checklists; standard operating procedures for test location; flight clearances; agreements with other supporting organizations; frequency management documents.

10.3.9 Additional sections required for tests involving R/Cs, UAVs, RPVs. radio and transmitter (type and frequency); location of kill boundary on map; FTS / procedure (description of system / procedure and how it works, who calls the kill signal); autonomous control system, pilot name and qualifications.

Attachment 6

NOTES TO THE BUYER

A6.1. Contractor Support to the AFRL Program Design Reviews.

Your contract shall state that the contractor shall support a design review or a series of design reviews during the course of the program. The number of reviews, their timing, and the topics to be covered will be program dependent and shall be determined jointly among the contractor, the AFRL PM, the PM's division technical advisor (if desired), and the AFRL Flight T&E office. Your contract shall state that the contractor shall submit the review agenda to the government for review and approval at least 15 days prior to the desired review date. Review topics shall include at a minimum technical objectives and success criteria, test article description, vehicle modifications, safety systems, airworthiness of vehicle(s) and subsystems, preliminary test plans and schedules, and instrumentation system requirements.

Reference AFRLMAN 99-103.

A6.2. Contractor Test Plan and Support to the AFRL SRB and TRB.

Your contract shall state that if your contract includes a test, experiment, or demonstration on an aerospace vehicle, AFRL must approve the test plan prior to testing, including taxi tests. An aerospace vehicle includes, but is not limited to, a manned vehicle, a R/C, an uninhabited air vehicle or a remotely powered vehicle. This requirement applies for both government and contractor conducted tests. Your contract shall state that the contractor shall submit the draft test plan (using DID DI-NDTI-80566A/T for the test plan format) to the government at least 8 weeks prior to testing and the final test plan at least 5 weeks prior to testing for review and approval. The contractor shall support the safety and technical reviews, the contractor shall either attend the reviews or participate via telecom. The decision of the type of contractor support to the reviews is made by the PM and technical and safety review board chairmen.

Reference DID DI-NDTI-80566A/T

Reference AFRLMAN 99-103.

A6.3. Contractor Support to AF Mishap Investigations.

Your contract shall state that the contractor shall adhere to AFRLMAN 99-103 in the event of a mishap (defined as an unplanned event, or a series of events, that result in damage to DoD property, occupational illness to DoD military or civilian personnel, injury to DoD military personnel on- or off-duty, injury to on-duty civilian personnel; damage to public or private property or injury and illness to non-DoD personnel caused by DoD operations). This includes, but is not limited to, immediate access to all test data, test-related documents, and vehicle documentation including, but not limited to, video, pictures, witness statements, onboard recorded data, telemetered data, vehicle systems checks, and vehicle or system squawk sheets. If an AFRL representative is not present during the mishap, the contractor shall notify the AFRL PM of the mishap as soon as practicable after the mishap has been debriefed at the test location

but no later than eight (8) hours immediately following the mishap. If the AFRL PM can not be reached in person, the contractor shall execute the notification procedures as specified on the AFRL Form 29. In the event of a mishap, the data and information collected must be protected until guidance is provided by a cognizant government representative. It is recommended that the contractor have an established safety representative, through whom communication will occur and the data and information collected will be transmitted to the government.

Reference AFRLMAN 99-103.

A6.4. Contractor Identified Lessons Learned.

Your contract shall state that the contractor shall provide lessons learned at the completion of the program about the formation, conduct, and reporting of the flight test program to include the design, development, and testing phases to the government using AFRL Form 20, *Lessons Learned.* However, if the lesson learned is safety related, the contractor shall notify the government immediately.

Reference AFRLMAN 99-103.

Attachment 7

AFMC CENTER AND LABORATORY FOCAL POINTS FOR SPECTRUM MANAGEMENT

AFMC, Wright-Patterson AFB OH	AFMC/A6OS	DSN 986-0782/3
Aeronautical Systems Center (ASC), Wright-Patterson AFB OH	88CG/SCXI	DSN 785-2181
Air Armament Center (AAC), Eglin AFB FL	96CS/SCWF	DSN 872-4416
Air Force Flight Test Center (AFFTC), Edwards AFB CA	95CS/SCMFS	DSN 527-4763
Air Force Research Laboratory, Wright-Patterson AFB OH	AFRL/CC	(Refer to AFMC)
Air Force Office of Scientific Research, Bolling AFB Wash DC	AFOSR	(Refer to AFMC)
Air Vehicles Directorate, Wright-Patterson AFB OH	AFRL/VA	(Refer to ASC)
Directed Energy Directorate, Kirtland AFB NM	AFRL/DEOS	DSN 263-6435
Human Effectiveness Directorate, WPAFB OH	AFRL/HE	(Refer to ASC)
Human Effectiveness (Remote Element), Mesa AZ	AFRL/HE	(Refer to ASC)
Human Effectiveness (Remote Element), Brooks AFB TX	AFRL/HE	(Refer to ASC)
Information Directorate, Rome NY	AFRL/IF	DSN 587-3246
Materials and Manufacturing Directorate, WPAFB OH	AFRL/ML	(Refer to ASC)
Materials and Manufacturing (Remote Element), Tyndall AFB FL	AFRL/ML	(Refer to AAC)
Munitions Directorate, Eglin AFB FL	AFRL/MN	(Refer to AAC)
Propulsion Directorate, Wright-Patterson AFB OH	AFRL/PR	(Refer to ASC)
Propulsion (Remote Element), Edwards AFB CA	AFRL/PR	(Refer to AFFTC)
Sensors Directorate, Wright-Patterson AFB, OH	AFRL/SN	(Refer to ASC)
Sensors (Remote Element), Hanscom AFB MA	AFRL/SN	(Refer to ESC)
Sensors (Remote Element), Rome NY	AFRL/SN	DSN 587-3246
Space Vehicles Directorate, Kirtland AFB NM	AFRL/VSEI	Refer to AFMC
Space Vehicles (Remote Element), Hanscom AFB MA	AFRL/VS	(Refer to ESC)
Arnold Engineering Development Center (AEDC), Arnold AFS TN	AEDC/SDC	DSN 340-5978
Boeing Guidance & Repair Center (BGRC), Heath OH	BGRC	(740) 788-4920
Detachment 2, 645 MATS, Greenville TX	Det 2, 645 MATS	(903) 457-4920
Eglin Frequency Control & Analysis, Eglin AFB FL	46JRS/DOSF	DSN 872-7976
Electronic Systems Center (ESC), Hanscom AFB MA	66MSG/SCB	DSN 478-5510
Human Systems Center (HSC), Brooks AFB TX	311CS/SCML	(Refer to AFMC)
Kirtland AFB LMR/Frequency Manager, Kirtland AFB NM	377MSG/SCXS	DSN 263-3769
Oklahoma City Air Logistics Center (OC-ALC), Tinker AFB OK	OC-ALC/ENET	DSN 884-8154
Ogden Air Logistics Center (OO-ALC), Hill AFB UT	75CS/SCM	DSN 777-2015
Warner-Robins Air Logistics Center (WR-ALC), Robins AFB GA	78CS/SCML	DSN 468-7886

Attachment 8
AEROSPACE PHYSIOLOGY TRAINING UNIT DIRECTORY

UNIT	ORGANIZATION	ADDRESS	DSN	*COMM*	FAX
Air Force Academy, CO	USAFA/DFB	2354 Fairchild Dr. Ste 117 Colorado Springs, CO 80840	333-2720	719-472-2720	3135
Andrews AFB MD	89 AMDS/SGPT	1045 Boston Rd Andrews AFB MD 20762-5451	857-4654	240 857-4654	4007
Beale AFB	9PSPTS/SGT	19301 McGregor St. Beale AFB, CA 93503-1215	368-8302	530-634-8302	4269
Brooks City-Base, TX	USAFSAM/ATTU	2601 Louis Bauer Drive Brooks City-Base, TX 78235-5130	240-3365	210-536-3365	2335
Columbus AFB, MS	14 MDOS/SGOAT	201 Independent Dr Ste 235 Columbus AFB MS 39710	742-2781	662 434-2781	7820
Fairchild AFB WA	92 ADS/SGGT	701 Hospital Loop Fairchild AFB WA 99011	657-5406	509 247-5406	5045
Holloman AFB NM	49 ADOS/SGGFT	280 First St Holloman AFB NM 88330	572-5760	505 475-5760	7775
Kadena AB	18 AMDS/SGPT	Unit 5267, APO AP 96368	315-634-1967	011-081-611-734-1967	4778
Langley AFB VA	1 AMDS/SGPT	45 Pine Rd Langley AFB VA 23665-2080	574-7827	757 764-7827	2429
Laughlin AFB TX	47 ADS/SGGT	590 Mitchell Blvd Laughlin AFB TX 78843-5244	732-6444	830 298-6444	6801
Little Rock AFB AR	314 ADS/SGGT	1090 Arnold Rd Little Rock AFB AR 72099	731-7389	501 987-7389	7210
Moody AFB	479 TRSS/OSP		460-7726	229-257-7726	7089
Peterson AFB CO	21 ADOS/SGGT	799 Vincent St Peterson AFB CO 80914	834-4185 -4186	719 556-4185 /4186	7652
Randolph AFB TX	12 ADS/SGGT	1960 Fourth St E Randolph AFB TX 78150-4028	487-4931	210 652-4931	5545
Shaw AFB SC	20 ADOS/SGGT	431 Myers St Shaw AFB SC 29152	965-6791	803 895-6791	6797
Sheppard AFB TX	82 AMDS/SGPT	836 19TH Ave Sheppard AFB TX 76311	736-2777	940 676-2777	3623
Tyndall AFB FL	325 AMDS/SGPT	340 Magnolia Ave Tyndall AFB FL 32403-5612	523-7026	904 283-7026	7029
Vance AFB OK	71 MDOS/SGOT	527 Gott Rd Bldg 826 Vance AFB OK 73705	448-7782 -7252	580 213-7782	7934

Attachment 9

CHECKLISTS

A9.1. Test Program Checklist

- Include test plan DID and notes to the buyer in your contract if the contract includes flight testing (3.2.2, 3.2.2, 5.7). Include GFR requirement in contract if required.
- Notify AFRL Flight T&E office of your program at least 3 months prior to test, earlier if possible (1.1).
- Obtain spectrum management guidance as soon as possible for RF emitter testing, (3.3.15).
- Determine if encryption is required (3.3.2).
- Prepare MOA/MOU/LOA or PI as required (2.1, 2.2).
- Determine if an ITT is needed (3.3.4).
- Obtain LTO or RTO assignment for your program (3.3.13).
- Determine if a CCB is required (4.2).
- Identify a TRB chairman for your program and have him/her assigned as chairman by the directorate chief scientist (5.2).
- Obtain SRB chairman from AFRL Flight T&E lead (5.3).
- Apply for flight authorization if an AFRL civilian, military, or contractor will fly during the tests (6.3).
- Obtain permission required to fly a UAV in airspace – e.g. COA, MOA, etc (8.3.3).
- Review test planning schedule to ensure adequate scheduling to perform AFFTC test oversight requirements (5.3, chapter 6).
- Determine if GFR services are required.

A9.2. Flight Test Program T&E Task Schedule

- At least 3 months prior to first flight, apply for certificate of authorization (COA) to fly UAV or radio controlled model in National Airspace
- At lease 3 months prior to first test event, notify the AFRL Flight T&E office of program.
- 8 weeks prior to first test event, provide draft test plan to AFRL Flight T&E office.
- At least 4 weeks prior to first test event, conduct TRB and SRB.
- At least 4 weeks prior to flights, apply for flight authorization for AFRL flyers.
- At least 3 weeks prior to first test event, provide final test plan to AFRL Flight T&E office.
- 1 week prior to first test event, obtain test card approval.
- Daily/weekly – provide daily flight test schedule and weekly summary of flight activity to the AFRL Flight T&E office.

A9.3. TRB Checklist (5.2)

- PM meets with AFRL Flight T&E office at least 6 weeks prior to the test event to identify TRB chairman.
- PM sends delegation letter to directorate chief scientist if the chief scientist is not the requested chairman.
- PM, SRB chairman, and TRB chairman meet to discuss program and schedule TRB and SRB dates; TRB is normally held prior to the SRB.
- TRB chairman preparation tasks:
  - Choose TRB members.
  - Send appointment letters to TRB members' supervisor.
  - Prepare AFRL Form 19B.
  - Assign someone to record and publish TRB minutes.
- PM preparation tasks:
  - Prepare agenda with TRB chairman inputs.
  - Prepare presentation for TRB.
- TRB chairman conducts TRB.
- TRB minutes package contents.
  - Minutes text:
    - General discussion of TRB: date conducted, chairman and PM names, recommended technical risk level.
    - Highlighted items.
    - Recommendations.
    - Action items.
    - Signatures: TRB chairman, PM, and recorder sign the minutes.
  - Attachments:
    - AFRL Form 19B.
    - TRB members.
    - TRB agenda.
    - TRB chairman appointment letter.
    - Other program specific pertinent documents.
- TRB chairman sends TRB minutes to SRB chairman.
- PM ensures all TRB and SRB recommendations and action items are addressed to the satisfaction of the TRB and SRB chairman after the boards are conducted and before meeting with the TAA.

A9.4. Safety Review Board Checklist (5.3).

- AFRL PM meets with AFRL Flight T&E office at least 6 weeks prior to test to assign an SRB chairman.

- PM, TRB chairman, and SRB chairman meet to discuss program and schedule TRB and SRB dates; TRB normally held prior to the SRB.
- SRB chairman preparation tasks:

  - Review TRB results.
  - Choose SRB members.
  - Send appointment letters to SRB members' supervisor.
  - Prepare AFRL Form 19A.
  - Bring copies of AFRL Form 12**,** and the risk assessment matrix (A3.5) to the SRB.
  - Assign someone to record and publish SRB minutes.

- PM preparation tasks:
  - Prepare agenda with inputs from SRB chairman.
  - Prepare presentation for SRB.
  - Prepare AFRL Form 29.

- SRB chairman conducts SRB.

- SRB minutes package contents:

  - Minutes text:

    - General discussion of SRB: date SRB conducted, chairman and PM names, recommended TRB and SRB risk levels, proposed flight dates and location.
    - Statement of who has mishap accountability.
    - Highlighted items – items to bring to the attention of the test approval authority.
    - THAs: list THAs and the recommended risk levels and any items of interest
    - Recommendations/
    - Action items.
    - Signatures: SRB chairman, PM, and recorder sign the minutes.

  - Attachments:

    - AFRL Form 19A.
    - SRB members.
    - SRB agenda.
    - SRB charts.
    - Test plan.
    - THAs/risk assessment chart.
    - TRB package.
    - AFRL/VA SRB chairman appointment letter.
    - RTO/LTO assignment letter.
    - AFRL Form 29.
    - Other program specific pertinent records.

- PM ensures all TRB and SRB recommendations and action items are addressed to the satisfaction of the TRB and SRB chairman after the boards are conducted and before meeting with the TAA.
- Obtain approval from AFRL TAA of the test plan prior to first test event, AFRL TAA signs AFRL Form 19A to approve test plan.
- Obtain 412 TW review and coordination /approval of SRB through the AFRL Flight T&E office prior to first flight activity.

A9.5. 412 TW Flight Operations Checklist:

- Flight authorization for AFRL civilian, military and contractor flyers (6.3).
- SRB review and approval (6.4).
- Aircrew and UAV operator qualifications (5.3, 6.5).
- Mishap reporting (6.6).
- Daily flight schedules (6.7).
- Post - flight operations summaries (6.8).
- Flight test card approval (6.10).

A9.6. Flying a UAV or R/C at WPAFB Checklist:

- Obtain an approved test plan (5.2, 5.3, 8.3).
- If using area behind AF Museum in Area B, schedule range time with range coordinator (Tony Absi, AFRL/SNJT, 59902 extension 4376) at least 30 days prior to the test.
- If using other areas on base to fly, obtain permission or coordination to fly from the owners and users (e.g. soccer and baseball fields).
- Notify the base frequency manager (88 CG/SCXI, 52181) of all frequencies to be used during test (vehicle, hand held radios, etc).
- Obtain permission from 88 ABW to fly on base if other area than fenced flying field between museum and I675 gate; notify the ASC Flight Safety Office (ASC/SEF, 40888) and the Air Base Wing Airfield Management (88 OSS/OSA, 72131) of the flights at least 72 hours before tests.
- Submit an AF Form 813, *Request for Environmental Impact Analysis*, to the 88 ABW/CEVO, if the test may effect the existing range environment, such as ground disturbances or construction.
- Obtain a land mobile radio (LMR) from 88 OSS/OSA.

A9.7. Flight Checklist: (Reference **Section 6.3** for details on the flight authorization process)

- Obtain signed copy of AFFTC Form 5416 or AFMC Form 81 from the AFRL Flight T&E office. Prior to each flight, ensure any contractor personnel requiring GFR oversight are listed on an AFFTC Form 5499 (or DMCA Form 644) signed and approved by the administering GFR. The form must be valid for the date of the flight and the aircraft type and serial number.

- Prior to each flight, obtain written authorization from your branch chief after their review of medical clearance and ground training currencies to ensure all flight prerequisites are still current.
- Provide projected flight schedule to AFRL Flight T&E office.
- Provide AFFTC Form 5416 or AFMC Form 81 to aircraft owner to obtain their approval to fly.
- Report actual flight activity to branch chief and AFRL Flight T&E office.
- Maintain log of actual flight activity to enable annual reporting to AFMC, as described in **Section 6.3.5**.

Attachment 10

INSTRUCTIONS FOR PREPARING AFFTC Form 5416

Block 1:

- For MESP orders (military): 412 OG/CC.
- For 12 flight MESP limit waiver: 412 OG/CC.
- For non-DV familiarization flight: 412 TW/CC.

Block 2: Leave blank.

Block 3: AFRL 3 letter branch symbol of flyer.

Block 4: AFRL PM.

Block 5: Grade or rank of flyer.

Block 6: Self explanatory.

Block 7: Self explanatory.

Block 8: Enter “MESP”.

Block 9: Phone number where flyer can be contacted.

Block 10: Office symbol where flyer is assigned or employed.

Block 11: Expiration dates of physiological training (if required) and physical (identify type of physical).

Block 12: Check appropriate block.

Block 13: Check all blocks that apply: first column – N/A, second column – self explanatory, third column – non USAF aircraft if applicable.

Block 14: Check only one block, or leave blank if N/A.

Block 15: Check only one block, or leave blank if N/A.

Block 16:

- Justification: include program name, full description of who the individuals are and why they need to be on the aircraft, their duties, expected flight dates, and any other information (i.e. location, number of flights, hazardous or special conditions).

- Expiration date: for MESP enter one year; for other types of flights, enter date of your choice – not to exceed one year.
- Civilian and military flyers: Signature and signature block of flyer's branch chief.
- Contractor flyers: Signature and signature block of flyer's CO.

Block 17: List all the types of aircraft on which the flyer wishes to fly. Orders are aircraft specific, the flyer is only approved to fly on the listed types of aircraft.

Blocks 18 and 19: Leave blank. The AFRL T&E office will sign as the requester.

Block 20:

- Physiological Training: Check if required – see **Para** 6.3.5.
- Egress, PDT and ALSE Training: Training required for orientation flyers in ejection seat aircraft. Training good for 72 hours.
- Emergency Procedures and ALSE Training: Training required for orientation flyers and MESPs flying in non-ejection seat aircraft.
- Abbreviated Egress Training: Individuals authorized to receive this training in lieu of formal life support training – MESP flying non-ejection seat type aircraft less than 12 times in 12 months (training expires 30 days after completion).
- Safety Review: Required for AFMC personnel to participate in flights in non-USAF aircraft. The AFRL SRB process fulfills this requirement. Reference AFI 11-401/AFMCSUP1, **Para** 1.11.1.6.
- AFFTC Form 5489: Check this block. Reference AFI 11-401/AFFTC Sup1, figure A12.2 for explanations.
- Clearance by Flight Surgeon: Required for MESP and familiarization flights. Attach AF Form 1042 to AFFTC Form 5416.

Block 21:

- MESPs limited to 12 sorties during any consecutive 12 month period: check block if MESP flyer is not applying for a waiver.
- No touch and goes/emergency procedures: Generally, MESPs are not authorized for these procedures; however, exception is when these procedures or maneuvers are required for a specific test defined in an approved test plan. Reference AFI 11-401/AFMCSUP1, **Para** 2.25.5 for additional information. Check block as appropriate.
- Remain below 18,000 feet MSL without physiological training: Applies to ejection seat training. Refer to **Section 6.3.5** in this AFRLMAN for additional information.
- Egress training valid for 72 hours: Applies to orientation flyers. See AFI 11-301/AFMCSUP1, **Para** 5.7.

Blocks 22 through 27: Leave blank

Governing document: AFI 11-401/AFFTC Sup 1.

Attachment 11

PART I/PART II DATA REQUIREMENTS

Part I Data Requirements (to be tailored for individual programs): This package includes information necessary for proposal evaluation or approval of the proposed modification by the procuring activity and responsible AFMC organization. The contractor presents the Part I data at the PDR. However, the PM should request this data package be delivered to him at least two weeks prior to the PDR in order to have enough time to distribute the package to the CCB. The CCB members should have the package about two weeks before the PDR to give them enough time to review it before the formal PDR.

Note:
Group A Equipment: Equipment that is a permanent part of the system structure. A physical modification must be made to remove Group A equipment.

Group B Equipment: Components that are not structurally part of the system (usually aircraft) and once installed can be removed without physically modifying the system.

The contractor data required in the Part I data package includes but is not limited to:

- Narrative description of the proposed modification.
- Preliminary drawings, diagrams, and sketches.
- System safety.
- Preliminary analyses and tests.
- Mass properties.
- External store compatibility.
- Power requirements, subsystems compatibility, and electrical lead analyses.
- EMC.
- Operating restrictions.
- Changes to performance, stability and control.
- Preliminary safety of flight test plan.
- Group B safety of flight certification.
- Demodification plan.
- Schedule.
- Thermal design and constraints.
- Human factors.
- Corrosion control.
- Interface requirements.
- Preliminary software design.

Part II Data Requirements (to be tailored for individual programs): This package includes information necessary for evaluation and approval of the final design, and data necessary to certify safety of flight. The contractor at the CDR presents it. However, the PM should request this data package be delivered to him at least two weeks prior to the

CDR in order to have enough time to distribute the package to the CCB. The CCB members should have the package about two weeks before the CDR to give them enough time to review it before the formal PDR.

The contractor data required in the Part II data package includes but is not limited to:

- Narrative description of the modification.
- Final design data including detailed design drawings and diagrams.
- Final analyses and tests.
- Detailed mass properties.
- External store compatibility.
- Detailed power requirements, subsystem compatibility, and electrical load analyses.
- Updated EMC.
- Strength summary and operating restrictions.
- Changes to performance, stability and control.
- Safety of flight test plan.
- Operation, maintenance and inspection instructions.
- Project equipment list.
- Drawing list.
- Engineering analyses, tests and report lists.
- Pre-safety of flight test documentation.
- Group B safety of flight certification.
- EMC, subsystems compatibility and other ground test documentation.
- Operation, maintenance and inspection instructions.
- Mission support equipment tests.
- System safety.
- Flight test plan.
- Updated demodification plan.
- Thermal design and constraints.
- Human factors.
- Corrosion control.
- Interface requirements.
- Software detailed design.

Note: The current DI-MISC-81562 replaced DI-E-3115B. The old document contained information about the contents of the Part I and Part II data packages. The current document does not. Therefore, this information is from the rescinded document and from the current AFMCI 21-126.

Governing Document: AFMCI 21-126.

Attachment 12

SUBJECT INDEX

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